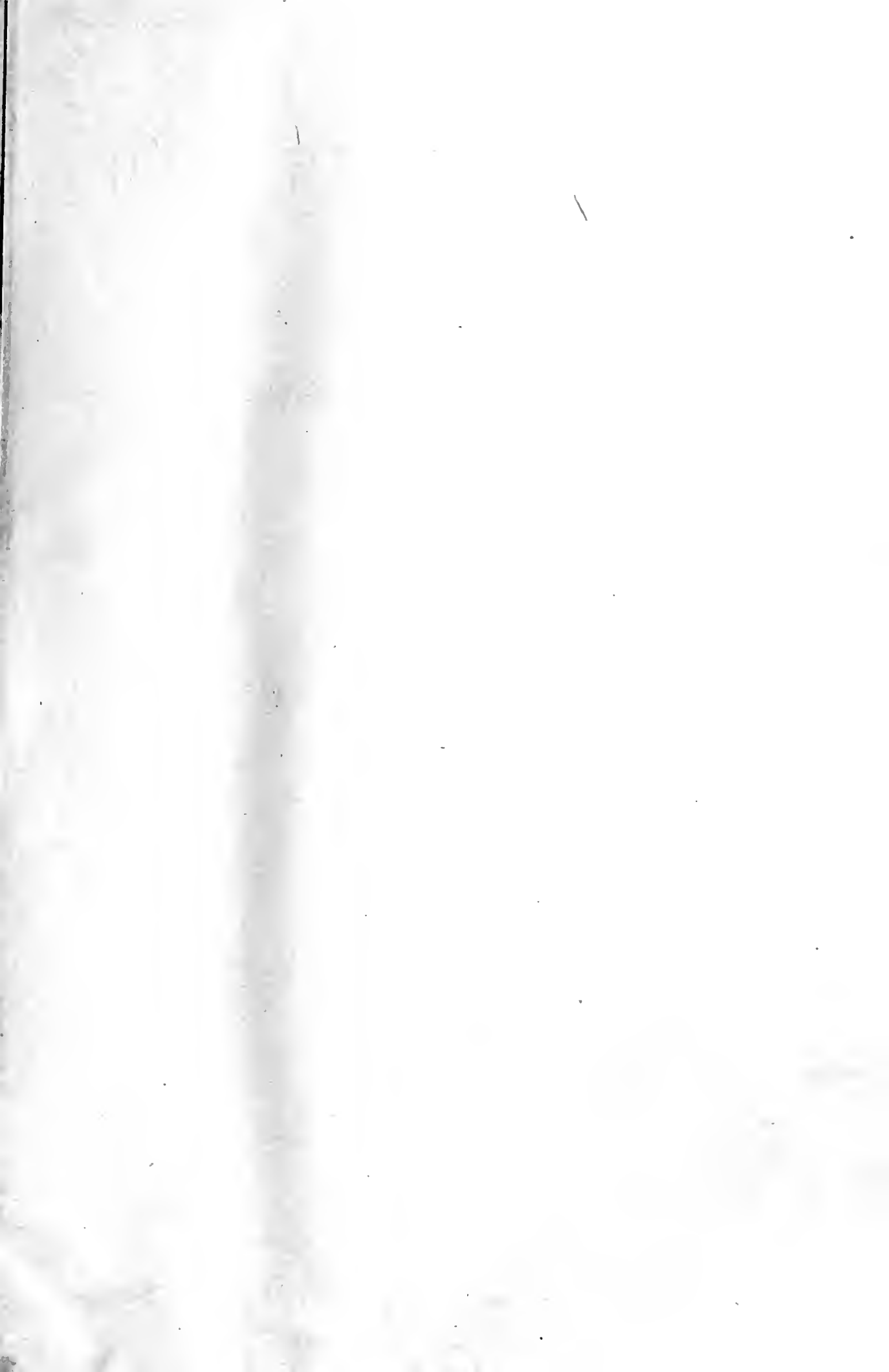




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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

RETROSPECTIVE.

THE year 1878 has not been an uneventful one in the history of architecture. If its practical achievements in building have been few, the incidents bearing upon the future of the profession have by no means been unimportant. Foremost among the few auspicious events to be recorded is the opening and close of the great gathering of arts and manufactures in Paris, which shone in remarkable contrast to the unsettled and disturbed condition of industry at home. The conference of architects held in June last, though it scarcely fulfilled its original purposes, dealt with a few questions of constantly recurring interest; while the policy of the Institute seems slowly to be undergoing a change which, though yet leaving much to be desired, will be admitted by the profession to be a decided step towards improvement, giving some hope of a better organisation of professional forces both within and without the metropolis. Taking a general glance at the architectural activity of the year, as shown in the larger and more important buildings, we find progress has been mainly in the direction of municipal, public, and ecclesiastical works, though the inception of the works themselves is in many cases anterior to the period of which we are writing. Among a few important structures whose completion or commencement calls for notice in our yearly summary, we may name the Birmingham Municipal Offices, by Mr. Y. Thomason—a building of considerable dignity and of a character to compete with the other edifices of the town; the new Gothic School of Art in the same vicinity; the Yorkshire College, Leeds, from Mr. Waterhouse's design, the first stone of which was laid early in the year; the Manchester School of Art, from the designs of G. T. Redmayne, architect, illustrated by us; the Bradford Hotel, by Messrs. Andrew and Pepper; the Cavendish College, Cambridge, by Messrs. Giles and Gough; the Pavilion and Winter Garden, Blackpool, by Mr. T. Mitchell; the commencement of the New University Hall, Glasgow, from the designs of Messrs. G. G. and J. O. Scott. The Town Hall and Public Offices competition at Barrow-in-Furness, a review of which appeared at the close of our second volume for 1877, has been finally settled, and Mr. W. H. Lynn, of Belfast, the architect, has been commissioned to carry out his design, which will be found illustrated, in plan and perspective,

in our first half-yearly volume for 1878, page 316. We certainly regard this as one of the most successful Gothic designs for a municipal building erected of late years, and the author is evidently adopting the same type of Gothic which Mr. Waterhouse has so ably appropriated for the same purpose in his great work at Manchester. The Council Chamber and other departments have been judiciously marked in the main elevation, and we may add the author has displayed as much ability in Gothic as he has shown in his Classic design for the Clark Hall, Paisley—another important structure which he is engaged in carrying out at a cost of over £40,000, and of which we gave an illustration, p. 340, Vol. XXXIV. That our readers may compare results, we illustrated in the same volume Mr. T. E. Collcutt's second premiated, and Messrs. Perkins and Bulwer's third premiated design for the Barrow-in-Furness Town Hall, pp. 106 and 134. These three designs illustrate three distinct treatments of modern design—one being in a Renaissance verging on Queen Anne, and the other two in Gothic, displaying opposite tendencies of that school. Another important building of the same class, to which we have given prominence, is the Reading Town Hall. Our review of these designs appeared at the close of 1877, and during the past twelve months we have given two of the premiated designs, Messrs. Alexander and Henman's, p. 596, Vol. XXXIV., and Mr. W. T. Sam's, p. 158. The unfortunate and abortive result of this competition will remain another warning to competing architects that, after all their labour, an outside architect may be employed to carry out the work. The design of Mr. J. V. Pearce, for the Great Yarmouth Public Offices, has been also selected during the past year, and was illustrated in our pages (see p. 318 of the last volume), besides the second and third premiated designs, pp. 210 and 368, and others submitted by Mr. E. F. Bishopp, p. 236, and by Messrs. Bell and Roper, p. 694. Though a comparatively small building, the competition was one in which a large amount of ability was displayed, and the designs we have selected as illustrations will show that the race was a particularly close one, and the selected plans characterised by considerable merit. We have also had to record the Aston Public Buildings competition (see page 257, Vol. XXXV.), the selected design for which was by Messrs. Alexander and Henman.

Vestry-hall architecture also has been exemplified in our pages by two buildings—the Hampstead Vestry-hall, by Messrs. Kendall and Mew (see illustration, p. 502), and the amended design for the Vestry-hall at Kensington, by Mr. Robert Walker (see illustration, p. 612). There is an official stamp about both these buildings. In neither case can we award higher praise. Of the latter building we also illustrated another design in a Queen Anne style, by Mr. J. J. Stevenson and A. J. Adams, placed second by the referee (see page 468, Vol. XXXIV.). The above examples are rather typical of the more recent phase of architectural effort as applied to business wants. Among a somewhat similar class of buildings the Shakespeare Memorial Theatre, Stratford-on-Avon, has made considerable progress under the architects, Messrs. Dodgshun and Unsworth. This building we illustrated September 15, 1876. The Dublin Markets competition has been settled, and the design of Messrs. Loekwood and Mawson awarded the first premium. Among other secular buildings are the new Concert-hall, St. Leonards-on-Sea, by Messrs. Hill and Vernon; the Rotunda Theatre, Liverpool, by Mr. C. J. Phipps and E. Davis and Sons; Theatre and Opera-house, Leeds, by Mr. G. Corson.

Of ecclesiastical works a few typical buildings in embryo must be named here. We may refer to the appointment of Mr. Pearsons as architect of Truro Cathedral, some of the other designs for which we have given; the competition for a design for the Oratory Church at Brompton, won by Mr. Gribble, and which elicited much talent from few of the foremost Renaissance architects; Clane Catholic Church, Kildare, by Mr. Hague, of Dublin; St. Michael's Priory and pro-Cathedral, Hereford; while three or four of lesser size call for notice, among them we must place Mr. Pearson's splendid brick church of St. John's, Red Lion-square, a view of which we publish to-day; St. Michael's Church, Northampton, by Messrs. Burder and Baker; Christ Church, North Kensington, by Mr. J. E. K. Cutts; and Union Chapel, Islington, by Mr. James Cubitt. In some of these we notice a marked departure from conventional types, and a bold adaptation of octagon and other forms of unimpeded central areas. The adoption of a scheme of decoration for the dome of St. Paul's, upon the basis of a design prepared by the late Mr. Stevens, the sculptor, is a matter that has occupied

attention, though it cannot be pronounced satisfactory mode of commencement; while a work of more national interest—the completion of the Wellington monument, from the same artist's design—has been completed during the year.

A few conspicuous buildings and works in the metropolis call for a brief remark. The eastern block of the new Law Courts has been completed in all essentials, and the central hall and courts are being pushed forward. The Natural History Museum at Kensington is approaching completion, and we have illustrated many of the details. The Grand Hotel, Charing-cross, and some important business premises in Northumberland-avenue and along the Embankment—namely, a conspicuous Renaissance block of chambers, by Mr. J. P. St. Aubyn—have arisen during the past year; while there is a rumour of a recommencement of the Opera-house. The Strand has shown signs of architectural activity in some new premises, some for the Art Union of London, while the Gaiety Restaurant of Messrs. Spiers and Pond has been completely remodelled by Mr. Verity. The Savoy Chapel has also been re-opened. In the City, a few business and mercantile premises have been finished or commenced. The City Liberal Club, the Gresham Life Assurance offices in the Poultry, by Mr. J. J. Cole (illustrated in our last number); Bank of Scotland, Bishopsgate-street, by Mr. Chatfield Clarke; new offices of the Prudential Assurance Company, Holborn, by Mr. Waterhouse, which we have also given, besides some buildings on the Holborn Viaduct by Mr. Witherington, and a few warehouses. Street improvements have been progressing. We refer to the opening up of the thoroughfare from Oxford-street eastwards, which has cut through some dense neighbourhoods, and will tend to infuse vitality along its route. The selection of a design for a high-level Tower bridge has at length given hope of something being done to relieve the crossing traffic of the east; the freeing of the tolls of Waterloo and Charing-cross bridges are significant of other changes on both sides of the river, and already some new lines of tramway are contemplated. But perhaps the most noteworthy incident of the year is the proposal made to light certain parts of London with the electric light.

The year 1878 has been prolific of congresses of one kind and another. And of these we may say a word. Our French neighbours' great international display on the Champ-de-Mars has helped us to compare results, and shown us that our architecture and industrial art and manufacture stand fairly among those of other nations, but from a purely art point of view, the gathering cannot be taken as a criterion of our real position. Congresses at Stafford and Cheltenham have discussed various questions of nearer interest to the profession. Of actual progress we can record little, despite a few contributions towards sanitary and artistic improvement. At the Architectural Conference, held last June, a few practical papers were read and discussed on such matters as "General Building Regulations for the Kingdom," &c.; but without any definite action or a prospect of general professional concurrence. Perhaps the part of the time best occupied was that spent in the series of visits paid to the Natural History Museum, the Law Courts, St. Paul's, and Dorchester and Bridgwater Houses, full accounts of which have appeared in our pages. Archaeology, too, has been represented by interesting meetings at Northampton and Wisbech. Abroad, the Convention of American Institute of Architects have been attempting to define the responsibility and liability of architects, and the surveyors of France have also held their international congress.

Referring to the organisation of the profession, the creation of a class of "honorary associates" in the Institute must be regarded as a step towards widening the influence of architecture and its professors outside the pale of the profession. Amateurs have always strengthened the hands of the practitioner—they infuse a new life and mode of thought, and take the professional man out of the narrow groove of custom and prejudice. With regard to the new policy towards non-metropolitan members there are still two opinions, and we think a still closer union between the Institute and country members is required before any reform affecting the professional interests can be carried. The want of power and support the Institute has felt in such questions as commission, quantities, competition regulations, and architects' liabilities, is notorious; and all these matters have been left in the same unsatisfactory position, owing to the lack of co-operation experienced. Indeed, we are not sure that provincial congresses, as proposed by Mr. Waterhouse at Manchester some time ago, or Mr. Corson's idea of provincial chapters in connection with the Institute, broached in our paper, are not desirable for the purpose of bringing about a better understanding in matters of discipline and practice. Mr. Barry justly alluded in his last address to the too passive attitude of the Institute during the last few years. It has done nothing to smooth the difficulties between architect and employer—nothing to create a public interest in professional pursuits—but has rather maintained its esoteric character of unpopularity. The Council of the Institution of Civil Engineers has also fallen of late years into something of the same apathetic indifference, and its constitution has, as we have seen of late, been threatened with internal disruption. The recent regulations as regards members and associates have been also rather the partial rectification of abuses than a sign of the adoption of progressive policy. One subject that has enlisted much attention during the year is that of competition, and the remarks which fell from the lips of the President of the Institute of Architects in his opening address have called forth a series of well-merited rebukes from a large young and rising class of the profession who have not the advantage of being born with a good name, or the good luck to belong to the Institute Council. Whichever way the question is regarded, we are bound to look at the system which the favoured few would stamp out, with all its faults as a necessity of the age, and we cannot possibly see the ground upon which a choice of a name is attempted to be substituted for that of actual results. As a writer in our own pages has observed, name has overcome for some few the inertia that impedes most men in a profession; and it is hard, we think, to take away the only remaining chance of proving ability they have.

One of the "burning questions" raised during the year has been that respecting the re-roofing of St. Alban's Abbey. The controversy, while it directly concerns a particular building, has a far wider bearing. Its issue is—at what state of decay should an old and interesting edifice be considered a fit subject for restoration?—because if we can substitute a new or improved roof we may also substitute a new tower for a half-decayed one, without respect for style or age. The letters of the architects, to the restoration committee (Mr. J. O. Scott and Mr. Street) are instructive in at least two aspects—one the difference of opinion on an architectural question existing between two leading architects of the Gothic school, and the other the extraordinary liberty with which members of the same profession can assail their brethren in a matter of a purely

practical nature, resting mainly on palpable and unmistakeable evidence. Mr. J. O. Scott's communication on page 23, illustrated by the sections of the roof, will be read with interest. About the singular effusions of clever amateurs who have added the subject to their immense budget of general information we have nothing to say. They may very well be left to speak for themselves, and readers fond of perusing such will find more of them on another page.

Death has been busy in the ranks of Art and the profession. The losses have included our foremost Gothic architect (Sir G. Gilbert Scott), and one of the most successful architects of the opposite school (Mr. Sydney Smirke, R.A.), Sir Francis Grant, President of the Royal Academy, Mr. Geo. Crickshank, Mr. John Penn, Mr. C. C. Nelson, Mr. F. P. Cockerell, Mr. H. Baker, Mr. Lockwood, Mr. John Johnson, Dr. Doran, Mr. Joseph Bonomi, Mr. Charles Summers, Mr. Timothy Hevey; in science and literature Mr. George Henry Lewes, and some others to whom the profession owed much.

The new year opens under far from auspicious auguries. There is no doubt that the general dulness of trade has begun seriously to affect the building trades, though at present to a less degree than that from which other branches of industry are suffering. That the worst may have passed over us—that a speedy revival in commerce may give fresh life to art and new work to artists and art workmen of all grades and classes, with wisdom to profit by past failures and experiences—is our best New Year's wish for all our readers.

ARCHITECTURAL ACOUSTICS.

THE science of acoustics is that which treats of all matters relating to the generation, transmission, comparison, and perception of sounds, but especially of those produced by the human voice or by musical instruments. In our present paper we shall consider this science in its relation to rooms, halls, or places of worship, in which the voice of a speaker or the sounds of an orchestra have to be brought to the ears of a large audience of persons.

The origin or mode of generation of every kind of sound is similar in its nature—namely, by the striking of one object against another so as to produce a concussion more or less violent, whereby a vibration or series of vibrations is produced either in the air or in a solid or liquid material, which surrounds the instrument by which the concussions are produced. Without some medium to transmit the vibrations to our ears no sound would be perceived, however hard one body might strike against another. This can be shown by suspending a bell or musical box in the receiver of an air-pump, and when the air is exhausted no sound can be heard outside the receiver; but as the air is admitted again the sound becomes audible, and increases in intensity as the density of the air in the receiver increases. Although the air is the medium by which sound is usually conveyed to our ears, it is by no means the only one, as nearly all materials, whether solid, liquid, or gaseous, have vibrations produced in them by blows, so that by placing the ear in contact with them the sound of the blows can be distinctly heard, independently of their being conveyed to us by the air. In fact, by putting the ear to the end of a long piece of wood or metal, a very faint blow at the other end will be distinctly heard, although the vibration produced in the air may be too feeble to be perceptible to a person close by whose ear is not in contact with the wood. When a sound is produced by means of a hammer striking on an anvil, by the beat of a drum, or by drawing a bow across the strings of a violin, the vibrations or wave motions which are set up will be propagated with equal

velocity and intensity in every direction around the centre of production until they strike against some obstacle, so that the intensity of these kinds of sounds must diminish in proportion to the inverse square of the distance which they travel over, the air through which the sound travels being supposed to be perfectly still. If, however, there is a current or wind moving in any direction through the air, it will have a great influence upon the intensity of the sound, strengthening it in the direction towards which the current is moving, and weakening it in the opposite direction. This is commonly noticed in the open air, where the wind has a powerful effect on the intensity with which we hear distant sounds, such as the discharge of artillery, the ringing of bells, or the music of a band, so that we are able by experience to determine the direction in which the wind is blowing by the greater or less distinctness with which we hear those sounds.

When the sound is produced by the human voice, or by any wind instrument, the intensity will not be the same in every direction, but will be greatest in that towards which the mouth of the speaker or of the instrument is directed, and will be least in the opposite direction or behind the speaker or performer, varying on each side according to the angle which any direction makes with the line of the greatest force. If a current of air flows against the face of the speaker the intensity of the sound in front will be diminished, while that of the waves behind him will be strengthened; while, on the contrary, a wind blowing at his back will strengthen the sound to those in front and weaken it to those behind him; consequently, the part of his hearers who are facing him will hear better, and those in the rear worse than when the air was still.

The intensity of sound is also dependent on the density of the air by which it is propagated, being very weak in highly rarefied air, and getting stronger as the density increases, so that it may be considered to vary with the height of the barometer. The presence of aqueous vapour in the air has a great tendency to weaken the sounds produced, as also is the case when the atmosphere consists of layers of air at different temperatures, or of varying densities—the kind of air in which sound is best heard being dry, still, and cold. The proximity of sonorous bodies to the origin of the sound tend greatly to strengthen it, as in the violin the body forms a box, in which the air vibrates in unison with the strings, the sounds produced by which would otherwise be scarcely heard at any distance from the performer; so also by placing hollow vessels of metal or wood near a speaker the sound of his voice may be greatly strengthened.

The velocity with which sound is propagated is very nearly the same for all degrees of intensity in the same medium, being in atmospheric air about 1,100 feet per second, whether it is dense or rarefied. In other gases the velocity varies very nearly in the inverse ratio of the square root of their density, being about 850 feet per second in carbonic acid, the heaviest, and 4,160 in hydrogen, the lightest of known gases. It has been found by experiment that when explosions of large quantities of gunpowder take place the velocity of propagation of the noise is considerably greater than when smaller charges are used; but in considering the velocity of sounds produced in a building, however large, we may take it for granted that all sounds, whether weak or strong, travel with the same velocities, there being no difference which can be perceived by the ear. When sound is produced under water the velocity of propagation in the water itself is about $4\frac{1}{2}$ times the velocity in air. The metals

and woods convey sound with great rapidity; in woods the velocity is greater in the direction of the fibres that cross the grain, being in pine 9 times that in air, in oak $11\frac{1}{2}$ times, and in fir nearly 14 times, while in iron the velocity of sound is 15 times the velocity in air.

The reflexion of sound is one of the most important phenomena in connection with the science of acoustics, as without it a speaker would find it as difficult to make himself heard in a room as in the open air. When the sound waves impinge upon a hard flat surface at any angle of inclination they will be reflected from it at a similar angle, but on the opposite side of the perpendicular to the surface at the point of their incidence, following in this respect the law of the reflection of rays of light; so that, if the direction of a sound wave which strikes on a plane surface is 45° with the perpendicular thereto, there will be a right angle between the direction of the impinging wave and that of the reflected one. If the wave strikes perpendicularly on a hard surface it will be reflected back in the same line as that in which it was moving, but in an opposite direction; hence it follows that when the distance of the reflecting surface is sufficiently great the speaker's words will return to him after a certain interval of time, and thus produce the phenomenon of echo. When this distance is 100 feet the time of going and returning will be $\frac{2}{11}$ ths of a second, which is too short a time to make the direct and reflected sounds distinctly audible to the ear, so that the original sound would in this case be strengthened by the reflected one. When, however, the distance is much greater than 100 feet, the echo will be heard by the speaker in such a manner as to interfere with the words which he utters with his mouth. The effects produced by the reflection of sound depend very much upon the kind of material which forms the reflector. If it is non-resonant—that is to say, hard and unyielding, as stone, marble, or brick—the reflected sound will be hard and sharp, as in the case of echoes generally; but when the material is resonant, or elastic, like thin and hollow wood or metal, the wave of sound communicates its vibratory motion to the substance itself, which it strikes, and this carries it along at a much greater velocity than the air wave moved with; at the same time a portion only of the sound is reflected, and is therefore very much modulated in tone. Sound waves striking on a smooth, flat, or convex surface at a low angle, are not always reflected, but appear to glide along the surface, especially when it is polished or very smooth. When the undulations impinge on a concave surface as a portion of a sphere or paraboloid, the reflected waves will be brought to a focus, as in the case of light—the focus of a segment of a sphere being at a point halfway between the centre of the surface and the centre of curvature; in the paraboloid it will be at the point called by geometers the focus of the generating curve. Conversely, if the sound emanates from the focus of either of these curved surfaces, it will be reflected from them in a direction nearly parallel to the axis of the reflector. In order, however, to produce these effects we must make the reflector of some resonant material—for when the waves meet with a soft inelastic substance, such as woollen or other cloths, their vibration is destroyed by the fibres of the cloth, and no reflection takes place.

Having thus briefly considered the laws of the propagation and reflection of sounds, let us now see how the knowledge they afford us can be applied to assist the architect in the designing and construction of buildings in which the sound of the human voice, or of musical instruments, has to be conveyed to the ears of an audience

of persons, as in churches, lecture-rooms, music-halls, and theatres—the arrangement, proportion, and materials of which have a great influence upon their acoustic properties.

The main object to be kept in view in building a room in which public speaking is to be heard is the avoidance of all material and arrangement that might interfere with or deaden the waves of sound as they proceed from the speaker to the audience, at the same time providing that the walls, roof, and floors shall be formed of such material as shall assist the voice by reflecting and conveying the sound which impinges upon them. Since the intensity of the sound has been shown to be weakest immediately in the rear of the speaker, it will be found advantageous to introduce as much resonant material as possible in this part of the room; thus in a church it would be well to have the chancel very much lower than the nave, and to form the roof of a polygonal or cylindrical shape, ceiled with thin and well-seasoned boards, laid longitudinal or parallel to the axis of the building. The walls also should be lined with thin wood as high as possible above the head of the speaker, with a hollow space between the woodwork and the wall. When the organ is placed in the chancel, or in any part behind the speaker, it will have a considerable tendency to strengthen his voice. A canopy of resonant material, of a slightly convex form, should always be placed a few feet above the speaker, when the room in which he stands is lofty, as it prevents much of the sound of his voice from being lost in the roof by throwing it down upon the audience.

It will be found advantageous to place the windows of the auditorium as high up above the floor as possible, and to line the walls from the floor to the window-sills with thin, well-dried wood, fixed with a hollow space behind it, and to avoid all recesses in the side walls, as these have a great tendency to break up the waves of sound. If the wall at the end opposite the speaker is flat its surface should be broken up by piers and recesses, or curtains might be placed at this part so as to prevent the echo of his voice from returning to the speaker's ear. Placing an organ at this end of a church should always be avoided, as it has a great reverberatory power. The ceiling of the auditorium should be covered with boarding, and the timbers of the roof should never be left open to the ridge, a polygonal or curved ceiling being best for conveying and reflecting sound. Vaulted ceilings of stone or brick ought never to be used where the human voice has to be heard by a large audience. The floor of the auditorium should be made to slope upwards, and the seats to rise one above the other, so that the persons sitting near the speaker should not intercept his voice from those further back. It is never well to elevate a speaker much above any part of his audience, as the voice can be thrown upwards with much less effort than it can be directed downwards. Concave reflectors have been sometimes placed behind a speaker to give greater effect to his voice, but they require that his mouth shall be always kept at the focus, and while they direct the sounds too powerfully upon the hearers immediately in front, they weaken them to those on the side and in the rear; at the same time, they bring all the whisperings and other slight sounds produced at the end of the room in a concentrated form to the speaker's ears. For these reasons they have generally been discarded as a hindrance rather than a help.

We have seen in the early part of this paper that the intensity of sound is greatly influenced by currents of air: every precaution should, therefore, be taken to prevent the introduction of these into a room where a lecture or sermon is being delivered, and

especially to avoid any such current from blowing towards the face of the speaker. The temperature of the air ought to be kept as uniform as possible in all parts of the room, good ventilation being favourable to its acoustic properties, so that the air shall not form into layers of different densities. The air should also be kept as dry as possible since the presence of aqueous vapour impedes the waves of sound. All external air should, therefore, be excluded in damp weather until it has been dried by passing through a warming apparatus, and a constant supply of dry air thrown into the room to remove the damp that arises from respiration.

In order that an auditorium may have good acoustic properties, its proportions of breadth, height, and length should be in the ratio of any three of the harmonic numbers 2, 3, 4, and 5, a very little deviation from which will often make a serious difference in the ease with which the speaker is heard.

The best form of plan for the auditorium of a lecture theatre appears to be that of a horse-shoe or a stilted semi-circle, the seats being arranged in concentric circles, rising one above the other in such a manner that none of the audience in front shall obstruct the sound from those behind. The lecturer should be only slightly elevated above the lowest row of the audience, and should be placed in a slight recess, the ceiling of which should be sloped backwards, and the walls covered with resonant material. The ceiling of the auditorium should be coved and formed of thin boards, and the same material used as a lining to the walls. Both floor and ceiling should have a hollow space behind them. Recesses and projections ought to be avoided as much as possible.

Where a room is intended chiefly for musical performances it is not necessary or desirable to have so much resonant material in the auditorium as in the case of the lecture-hall, since there is a greater volume of sound produced, which, in a room of moderate size, requires deadening rather than strengthening; but the parts around the orchestra should be made as resonant as possible, the ceiling over it being much lower than that of the auditorium, and sloped or curved backwards so as to assist in throwing the sound forwards. For large concert-halls the circular or elliptic form of plan appears to give the best effects, the rectangular form, with square corners, being the worst. A boarded ceiling is always preferable to one of plaster, and the polygonal or curved form to the flat one. In a large room, on the elliptical plan, a speaker placed at one focus of the ellipse will be distinctly heard in all parts, provided the walls, ceiling, and floor are formed of resonant materials in such manner as we have described.

In lofty rooms a gallery often has a beneficial effect on the sound, especially if placed at the end opposite the speaker or orchestra. Side galleries, in an oblong room, may also be beneficial, provided they are not constructed with too great a projection from the wall; the front being made of wood and its surface free from projections.

It is generally observed that a room may be a very good one for hearing in when crowded with people, but if the audience is only a scanty one there is an unpleasant amount of resonance, which makes it difficult to understand the speaker or enjoy the music; this difference arises from the clothes of the audience acting as a damper to the sound and deadening much of the reverberation from the walls and other parts of the room when it is filled with people, which is not the case when only a small number of persons is present. Too great resonance, however, should be always avoided in rooms of this kind, and it can always be prevented by the free use of

woollen material in the form of curtains or other hangings in the parts of the room most remote from the speaker. In designing a public room, however, the architect should keep in mind the object for which it is intended to be used, and by a little attention to the arrangement of its parts and the selection of his materials, he will find no difficulty in producing a building in which an auditory may listen to a speaker without straining their attention, or enjoy music without being deafened by reverberations.

THE GROSVENOR GALLERY.

THE winter collection of drawings by the old masters at the Grosvenor Gallery sustains the reputation that has been already won for this recently-established institution. Sir Comtts Lindsay has also judiciously brought together in one gallery a few of the water-colour drawings by living masters of the British school as a complement to the collection of last year, illustrating the history of water-colour painting in England. One of the choicest morsels of mediæval painting consists of two quaint line drawings on vellum, shaded in bistre of a brown tone—one representing a king on horseback receiving the keys of a city, and another of the same size representing a king on his death-bed surrounded by his children and courtiers. The conception is probably derived from the old fable of a "Bundle of Sticks." Red is freely used in the dresses; and the figures, though of conventional stiffness, are remarkably well drawn, especially the faces. This work is dated about 1470, and belongs to the Early French school. No. 11 is a composition sketch for a spandrel of a draped female figure, assigned to Giulio Pippi or Romano, as he is called, about the 16th century. The work, like most of the collection, is a pen drawing shaded with bistre. Andrea Mantegna (1431—1506) is represented by several excellent subjects—one, a study, entitled in the catalogue "Combat of Marine Deities," lent by J. C. Robinson, Esq. The two bistre sketches on vellum of SS. Peter and John (20), ascribed to Giovanni Bellini, are spirited figures. Some of the water-colour washing has peeled off in places. Of a Decorative character is "St. Luke and St. John," in red and white chalk, by Pierino del Vaga (1500—1547); but a more remarkably fine drawing is 23, "The Entombment," by Andrea Mantegna. It is a bistre drawing upon brown paper, and is the original of the engraving by the artist. Every line and touch is perfect, and the work is exceedingly well finished. A design for a chalice by the same master (35) is also highly-finished in detail, drawn in bistre. The chalice has a plain bowl, with a band of engraved work, a rich octagon-shaped knob with figures, and the foot scalloped. It has been engraved by Hollar. Various other studies and compositions of this artist are exhibited. The "Head of the Laocöon," by A. Carracci (1560-1609), is a bold colossal size sketch in black chalk on brown paper, in which there is much expression. One very interesting architectural drawing is No. 52, "Finished Design for the Sedilia of a Church," ascribed to Bramante. The composition is a Renaissance series of pilasters and openings in five bays drawn in sepia and shaded with blue. A clever composition is "The Birth of St. John the Baptist," by Carlo Cignani (1628-1719), a bistre sketch, heightened with white, on dark paper. The loans to the collection by Robert R. Roupell, Esq., are particularly valuable. We note also a figure of a Saint, probably St. John, holding a book, assigned to L. Ghilberti (1381-1485). The drawing is silver point on an olive green ground shaded with bistre and touched up with white (60).

No. 64, a group of three figures in adoration of an angel, by Luca Signorelli, is interesting. It has squares over it for the purpose of enlarging, and it is said to be the study for the author's "Nativity," painted in 1496, or a portion of it. The sketches in sepia, touched with white, on brown paper, by Filippino Lippi (Nos. 69, 70, and 71), are exceedingly vigorous and spirited, displaying excellent grouping, as in "Adoration of the Magi." The "Virgin and Child," by Parmigiano, is a very fine study in bistre. Leonardo da Vinci is well represented in allegorical subjects, portrait studies, and drapery; these are chiefly in black chalk, on brown or blue paper, heightened with white. "The Virgin and Child" (93) and the "Grotesque Head" (94) are vigorous. Most of these have been lent by Christ Church College, Oxford. Various interesting sketches and studies of heads and groups are exhibited, ascribed to Correggio (1493-1534). We particularly notice 109, an exquisitely-finished drawing in black and red chalk of "Virgin and Child," the colours having gone; 105, a composition in pen and ink, and 110—figure of "St. Peter and other Apostles, seated on Clouds"—a good composition. No. 130 is a fine head of a woman by Titian, life-size; the face turned partly round: in black and red chalk. No. 159, a fine composition for a series of studies in oil, for a large picture in the Florence Gallery, representing a "Triumphal Procession of Henry IV.," by Peter Paul Rubens; also a "Group of Amorini," in sepia, by Sir Anthony Van Dyck (59). A "Bacchanalian Procession," by Rubens (164), is a clever group; so is 168, "Two Apostles," a conception marked with much vigour both in figures and drapery. By the same master is "Venus leading Cupid" (186), a water-colour drawing. That admirable painter Canaletto (1697-1768), is represented by a fine architectural sketch of a "Roman Bridge in Ruins" (190), drawn boldly in sepia, and washed in colour. The same artist's "View of Old Westminster Bridge, with the Abbey" (384), is still more admirable as an effective drawing in India ink shading with brown lines, in which we are led to think how well suited for architectural effects the ink and simply washed sketches were of the last century. See also 386, a pen and washed sketch of a building. Of other studies we may mention the "Judgment of Paris" (193), by Van Dyck; Rembrandt's sketch of a "Young Woman Sleeping" (201), in which a few strokes of the brush produce a telling effect in the drapery; his "Angel Appearing to Peter" (217), a striking sketch, boldly washed in sepia; "Village on Bank of River" (223); Dusart's "Boors Playing Backgammon in an Alehouse," finished in colour (233); Van Ostade's "Front of a Tavern" (241); "Design for a Saltcellar" (330), by Titian, a pleasing conception in red chalk; "Dutch Interiors," by Jan Steen; also an "Interior of a Dutch Cabaret," by Van Ostade (344), wonderful in vigour and effect; some pieces by Teniers, Cuyp, and Van der Velde; a very charming landscape study of trees in chalk, lightly washed in colour on grey paper, by Anthony Waterloo (1618—1679); a spirited red tinted sketch of the "Adoration of Shepherds," by Veronese; also some decorative figures, suggestive for spandrel or pediments (378); a charming and feeling sketch of Venice, by Francesco Guardi (383); a rough but spirited bistre sketch of "A Baptism," by Donatelli (391); studies by Leonardo da Vinci (397); and some singularly instructive sketch diagrams of figures, showing rules for proportioning the figure, by Andrea del Verocchio, said to be those given to his pupil Leonardo da Vinci (Nos. 401 and 402). In these we find the length of foot is given as one modulus, and the span of hand as another measure. We

must not overlook also some fine studies by Perugino, lent by Mr. James Knowles; a design for a ceiling by Velasquez (463); a water-colour sketch of avenue, by Watteau; "The Dream of Human Life" (497); and a cartoon for a colossal representation of Charity, drawn in black chalk on brown paper with all the vigour and animation characteristic of that great master of the figure, Michael Angelo.

Passing to the water-colour gallery, by artists of the British school, we find the works of such eminent masters as E. J. Poynter, Smallfield, Alma Tadema, Marsh, Sir Coutts Lindsay and Lady Lindsay, Gow, Wolf, Bongh, Corbould, Lockhart, Macallum, Orrock, Hine, T. Danby, Dobson, Carl Haag, Frupp, Marks, A. W. Hunt, Hubert Herkomer, Linton, Crane, Whymper, and others. Mr. Poynter, in his "Venus and Æsculapius" (794), and other drawings, exhibits the finished conceptions of the master, which contrast by proximity to other bolder handling. Mr. A. H. Marsh, in his "Mussel-banks on the Conway" (799) charms by the rich tones of his banks, as in 801 he does by the vigour and freshness of the young ruddy mussel-gatherer. "The Pet of the Crew," by E. G. Gregory, is a conscientiously drawn and finished picture, bespeaking its story very well; while Mr. Parker's "View at Hurley, Bucks," and his "Hurley Lock" (813), are bright, sunny, spring-like pieces, in which the artist has employed body colour. In the last picture the figures of boys, and the lock and light foliage in the background, are inimitably finished. Particularly facetious is A. C. Gow's "Lord Foppington's Levée" (814). The servile expressions of the attendants just entering the bed-chamber, and the anxious look of the fop—in his dressing-gown, seated by a toilet table—as he looks back, are as excellent as the bedstead chintz and the chimney-piece and oak-panelling of the room. A fancy drawing-room piece is entitled "The Sleepers"—a young girl, clad in a muslin dress, with scarlet sash, lying on a couch, with a kitten, fast asleep also, on her breast (815). We have seldom seen a cleverer study of a rough sea than Mr. Powell's sketch (828) of "A Grey Day at Sea." The huge trough and the smaller ripples are as true to nature as the colouring. Close to it is a small sketch ("A Misty Morning," by Mr. F. Powell), exceedingly simple, but the mist on the water and the aerial perspective are illuively real. We note also "Anstruther," a richly-coloured landscape, by Sam. Bough, R.S.A. (833); another very conscientious landscape by the same artist ("Hamilton," 835); Mr. Lockhart's "Water Gate of the Inquisition, Spain"—a spirited drawing, clearly coloured; Mr. Walton's "Cover Wood"—rich in autumn tints; and, especially, Mr. H. Macallum's "Return of the Beer Fleet" (852), which, for the figures of fishermen, the boat grouping, and colour, can hardly be surpassed. Mr. W. C. Dobson's "Young Nurse" (864) is a pleasing study of children's faces without artifice; and Mr. Hine's "View of Downs near Lewes" is equally truthful in its soft rendering of undulating downs such as we see them in Sussex. Aerial in its colouring is a lake scene by T. Danby (872), contrasting with "Wave by Moonlight," by A. Severn. No. 884 ("Gipsies"), by Mr. R. W. Macbeth, is a bright study, well finished, of a shady orchard, with a gipsy fiddler, to whose tune two gipsy women are listening intently. Mr. Albert Goodwin is represented by two striking pieces—"Verona" (889), a rich study of colour in the Campanile—so lauded by Ruskin—and the painted house fronts, and in "Abingdon Churchyard," with its fine wooden verandah. No. 908 ("Meeting on the Turret Stair") sounds like a mediæval tale. Told by Mr. F. Burton, it shows a warrior, clad in chain

armour, meeting a young woman, whose face is turned in anguish of despair. A few drawings of architectural subjects must be noticed. "Where stood Bridewell Hospital and Prison" (913), by Mr. G. P. Boyce, is a faithful rendering of St. Bride's steeple and the old brick houses from the deserted site. That well-known painter, Carl Haag, in his "Entrance to a Kahn, Jerusalem," has shown the power of his pencil, and there is a depth of tone in the crypt-like vault. His "Acropoliss" (925) is a sensationally striking picture of the marble citadel and limestone buildings with the plains and hills beyond, the rock and temples bathed in a ruddy glow which almost unnaturally contrasts with the purple distance. Mr. A. D. Frupp is an artist whose works have always a charm of unaffected truthfulness in detail. His "Old Church Porch, Dorset" (934) is an admirable drawing of a beautiful wooden porch, which the artist has reproduced with all the effect of the grey time-stains and clefts in the oak, blending happily with the red tile roofing. In the same class we place Mr. John O'Connor's "Priory, Hampstead" (1018), a fine Elizabethan portal and front; its grey stone carving and the background of gables being most skilfully and feelingly handled in colour. Equally bold and effective is the "Old York Gate," by the same artist. We can only mention a few other pictures striking for qualities of drawing or colour. Mr. T. R. Lamont's "Bonny Kilmenny" (947), in three tableaux, is a pathetic story or legend told with much tenderness; Mr. Buckman's "North Country Wrestling" (938), a decorative treatment; 948, "A Backwater on the Thames," by Mr. E. Fahey; Mr. Mark's "What Is It," some rainbow-coloured pieces, by Mr. A. W. Hunt, as "Durham" and "Loch Torriden" (956-7) exceedingly soft and brilliant; clear and carefully handled drawings, by G. Frupp (972-980); an expressive miniature piece, entitled "Weary," by H. Herkomer, and a few clever and striking landscapes, by Mr. H. S. Hine, P. F. Naftel, J. W. Whymper, T. Danby, R. W. Macbeth, Otto Weber, and J. Orrock. We have not touched the Sculpture Gallery, filled as it is with studies by Domenichino, Raphael, Albert Dürer, and some choice sketches of the Venetian, German, and Early Flemish school. The collection of drawings by J. A. D. Ingres (1780-1867) is unique of its kind, and is well worth a separate visit.

CANAL AND CULVERT TABLES.*

THERE have been considerable difficulties in the way of adopting an accurate formula for calculating discharges and velocities in rivers, canals, and culverts, and Mr. Lewis D'A. Jackson, A.M.I.C.E., the author of "Hydraulic Manual and Statistics," previously reviewed in these pages, has calculated and compiled a collection of tables based on the formula of Herr Kutter, now recognised as the most correct. The tables of Mr. Jackson are intended for practical use, and the author has attempted to meet the requirements for greater accuracy than has been usually found in treatises of this sort. The gradation of quality of surface and irregularity of course are important elements in such an investigation; but Kutter's formula is so complex and involved that we hail some work giving tables that may be referred to by the practical engineer. The main object of the tables is to afford a ready determination of mean velocities and discharges (which are given in feet and cubic feet per second) to suit various sections, conditions of surface, regularity, and hydraulic inclinations in all ordinary cases. The mean velocities and discharges in Tables VI. and VII. do not apply to heads of pressure, but to conditions in which the pipe runs full-bore without "heading up." Kutter's general values, or co-efficients of roughness and irregu-

larity, are not considered perfect by the author, who assigns the following values of the coefficient of roughness (N) for artificial materials:—

1. Smooth plaster and glazed material	0.010
2. Ashlar, brickwork, cast and wrought iron, unglazed pottery	0.013
3. Rubble	0.017

In the tables given sewers of circular form, ovoidal section, as used by Hawksley, and the Metropolitan pattern, together with the peg-top section of the author, are adopted, the latter being considered better to insure greater scour, and to prevent the lodgment of sediment. The sides of this form are straight. Valuable sectional data are given in Table IV., in which the sectional areas, hydraulic radii in feet for pipes of these sections are stated. Thus we find on reference to it, that in Hawksley's ovoid culvert of 2ft. transverse diameter, under head "Full," the sectional area is 3.9820, the hydraulic radius 0.5532; when two-thirds full the area is 2.6856, and the radius 0.620, and when one-third full the area is 1.0276 and the radius 0.396. Table VI. gives mean velocities of discharge in feet per second, quantities discharged in cubic feet per second, and coefficients of mean velocity for culverts and pipes of various sections in cast or wrought iron, brickwork, and stoneware. We cannot give in a brief notice a fair account of all these tables, but we can recommend Mr. Jackson's work to the practical engineer as one of the most reliable of textbooks in this branch of engineering.

COMPETITIONS.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC.—The board of management some few months ago invited Messrs. Batterbury and Huxley, Mr. M. P. Manning, and Mr. F. W. Stent, to submit in competition plans for rebuilding the above-named hospital in Queen-square. The board have decided to adopt the plans submitted by Mr. M. P. Manning, of Mitre-court, Temple. The honorarium to the other competing architects was fixed at fifty guineas.

SWINDON BOARD SCHOOLS.—At the meeting of the Swindon School Board last week it was reported that no fewer than 162 letters had been received in response to a preliminary advertisement inviting architects to send in plans for the proposed new schools. A long discussion ensued on the general question of throwing the competition open to all comers or confining it to local men. Several members spoke in high terms of the work that had been carried out at Stratton and elsewhere by local men, but an opinion was expressed that the requirements would be met at a lower cost if all architects were allowed to compete. Eventually the matter was referred to a committee.

A new Baptist chapel and schoolroom are in course of erection at Blackley, near Halifax. The chapel will accommodate 500 adults, and 240 children. The fittings are of pitch pine varnished, and will be ready for occupation in June next. Beneath is a schoolroom, which is so far completed that it was opened last week. It will hold from 350 to 400, and adjoining are superintendent's vestry, serving kitchen, store-room, and heating apparatus room; above are ministers', deacons', and singers' vestries. The architect is Mr. C. F. L. Horsfall, of Halifax, and the contractors are—masons, Mr. T. Bottomley, Elland; joiners, Messrs. Hurst and Wilson, Elland; glazing, Mr. J. Bolton, Halifax; heating apparatus, Mr. J. Calvert, West Vale. The total cost will be about £3,500.

The premises of Messrs. J. Beal and Co., the well-known Brighton newsagents, have been reconstructed, under the supervision of Mr. Arthur Loader, architect, of Brighton. Mr. G. R. Lockyer being the builder. The cost of the work has been £2,000.

An exhibition of works by the students of the Halifax School of Art is on view at the Mechanics' Hall in that town. They include three oil and prize works, and many water-colour, pencil, and crayon drawings, but the chief feature in the exhibition is the pictures by Mr. Stopford, the headmaster, of which there are twenty-two, embracing scenery in Ireland, Wales, and on the English coast.

* Canal and Culvert Tables, under a modified classification. By LEWIS D'A. JACKSON, A.M.I.C.E. London: W. H. Allen and Co., Waterloo-place, S.W.

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ILLUSTRATIONS.

CHURCH OF ST. JOHN THE EVANGELIST, RED LION-SQUARE,
HOLBORN—ROYAL ACADEMY PRIZE DESIGN FOR A TOWN
HALL—THE ENTRANCE GATEWAY TO SOMERSET HOUSE
—VILLAS AT GREEN HILL, HAMPSHIRE—NEW PREMISES
IN WOOD-STREET.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ROYAL ACADEMY TRAVELLING STUDENTSHIP
DESIGN FOR PROVINCIAL TOWN HALL.

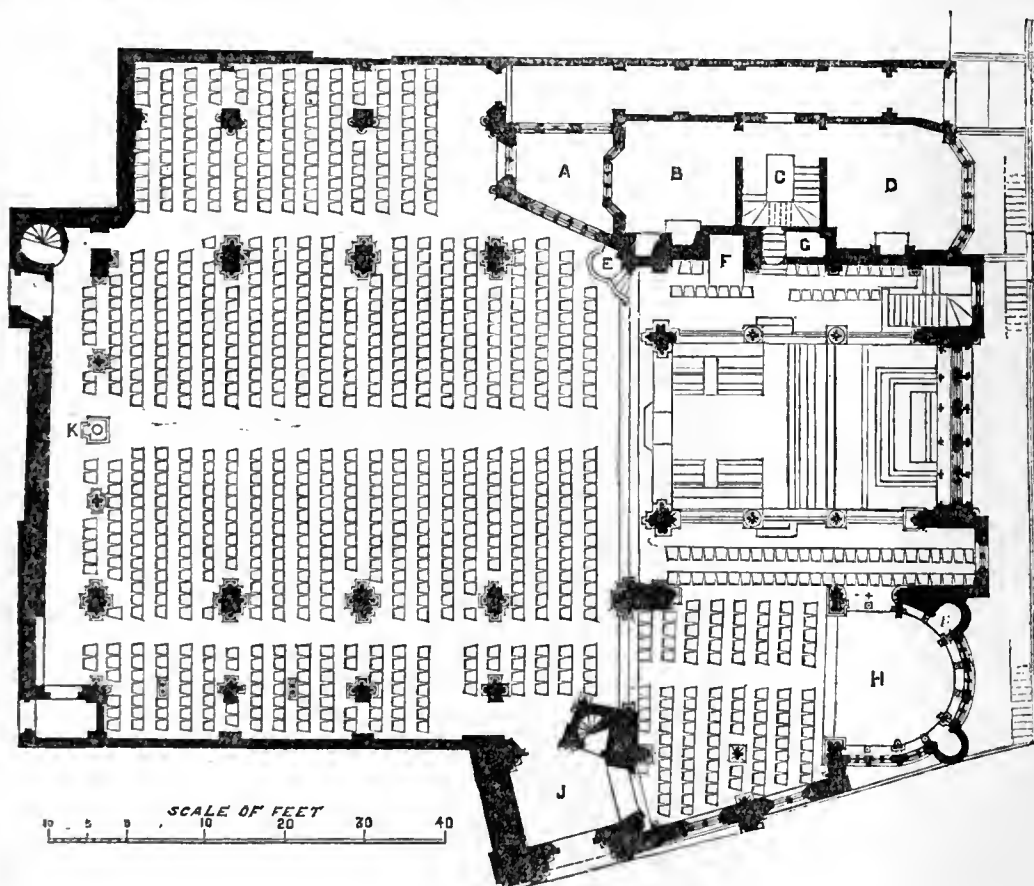
THESE drawings, for which the studentship has
been awarded, were made within the Academy
during the month of October, according to the

ment. As it is probable that such a building
would be heated by other means than open fire-
places, these have been intentionally omitted
throughout, which accounts for the absence of
chimneys in the design. The accommodation
provided is slightly in excess of the conditions,
without occupying the whole of the given area
of site.—W. S.

ST. JOHN'S, RED LION-SQUARE, HOLBORN.

THIS perspective view and the ground plan
will show the design and arrangement of this
church more completely than any written
description could do, and therefore it will only
be necessary to give some of the leading
dimensions, and to describe the nature of the
materials which have been used in the build-
ings. The chancel is 34ft. by 20ft., and, in-
cluding its aisles, 40ft. wide; the morning
chapel 17ft. by 40ft. long; the nave 38ft. 6in.
by 74ft. long, and, with its aisles, 82ft. wide.
Height of nave and chancel, 54ft.; height of
aisles, 20ft.; height of chapel, 22ft. The
material used for the dressings is Bath stone,
both inside and out. The facing to the outside
is of red brick, and to the inside of picked
stocks. The church, in every part is groined,
the ribs of Bath stone, and the spandrels filled
in with stock bricks. The object being to pro-
vide as much accommodation as possible, every

Royal Academy, and, as measured details of
one of the best works of that distinguished
architect, Sir William Chambers, they will, we
are sure, be valued by our readers. Our illus-
trations to-day show one bay (the central one)
of the longitudinal section and elevation of the
entrance to the courtyard of Somerset House
from the Strand, and one bay of the cross
section looking towards the Strand, and giving
a section of the central doorway to the Strand
wing on the right-hand side of the entrance,
originally used by the Royal and Antiquarian
Societies. We also give a plan looking up of
the soffit of one of the cross arches. There are
on plan three bays each way, the central one
crossways being used for carriages, those on
either side being for footways. The following
notes have been sent us by Mr. Gibson, who
also remarks that all the work, ceiling, &c.,
above the main cornice is executed in plaster.
Much of the delicate detail is lost in reality on
account of the shadow of the entrance arches.
(At an early date we shall give some of the
enrichments to a larger scale.) *Notes to the
drawings:* The setting out of plan is not quite
rectangular. The piers on each side of the
centre openings of fronts are before the general
line, which is, however, followed by the arches
over. The two side piers of Strand front are
narrower than the two centre piers. The



usual regulations. Being done, to a certain
extent, "against time," there was little oppor-
tunity for careful thought, either in plan or
elevation, and while not wishing to escape
criticism, the author is conscious of several weak
points in the design. The plan is arranged
so as to isolate, as far as possible, the three
main divisions of the building (each having a
separate entrance, &c.), and at the same time
to afford complete intercommunication when
desired. This is effected by means of a central
area, round which is a corridor divided by
grilles, so as not to interfere with light and
air. The sessions court is placed on the north
side, and the assembly-room on the south; the
principal entrance, hall, and council chamber
on the west; while on the east are the mayor's
suite of apartments (with private entrance and
staircase), and the access to police offices, fire-
engine, &c., which are provided for in the base-

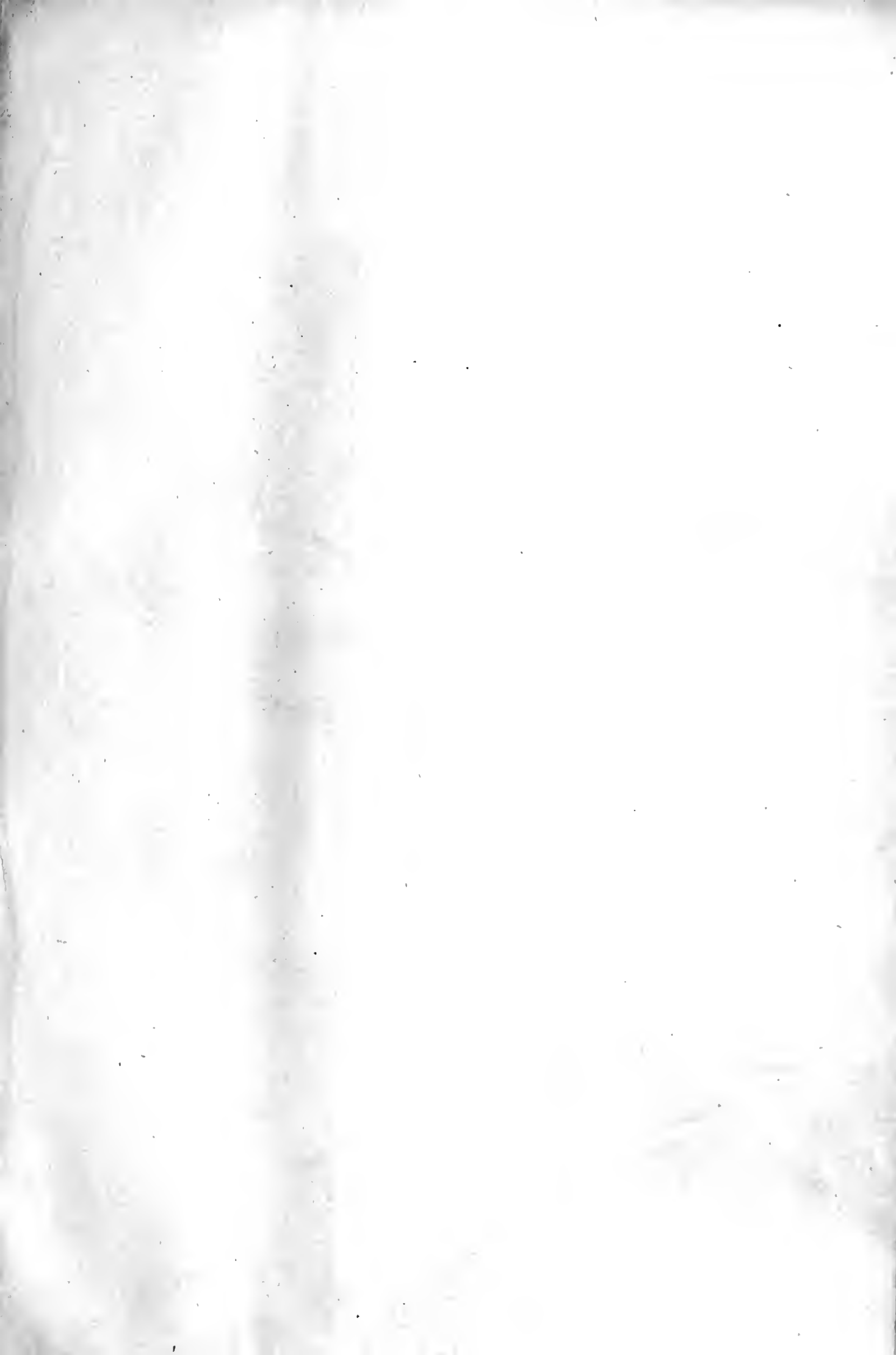
inch of the site has been covered by the
church. The outline of the church is conse-
quently of a very varied nature, owing to the
adjoining properties against which it has been
made to fit, and there are many peculiarities
about the church which have originated out of
this irregular site and the necessities of the
case. The architect of the building is Mr. J.
L. Pearson, A.R.A. References to plan:—

- | | |
|-----------------|--------------------|
| A. Area. | F. Organist. |
| B. Study. | G. Area. |
| C. Staircase. | H. Morning Chapel. |
| D. Dining-room. | J. Tower. |
| E. Pulpit. | K. Font. |

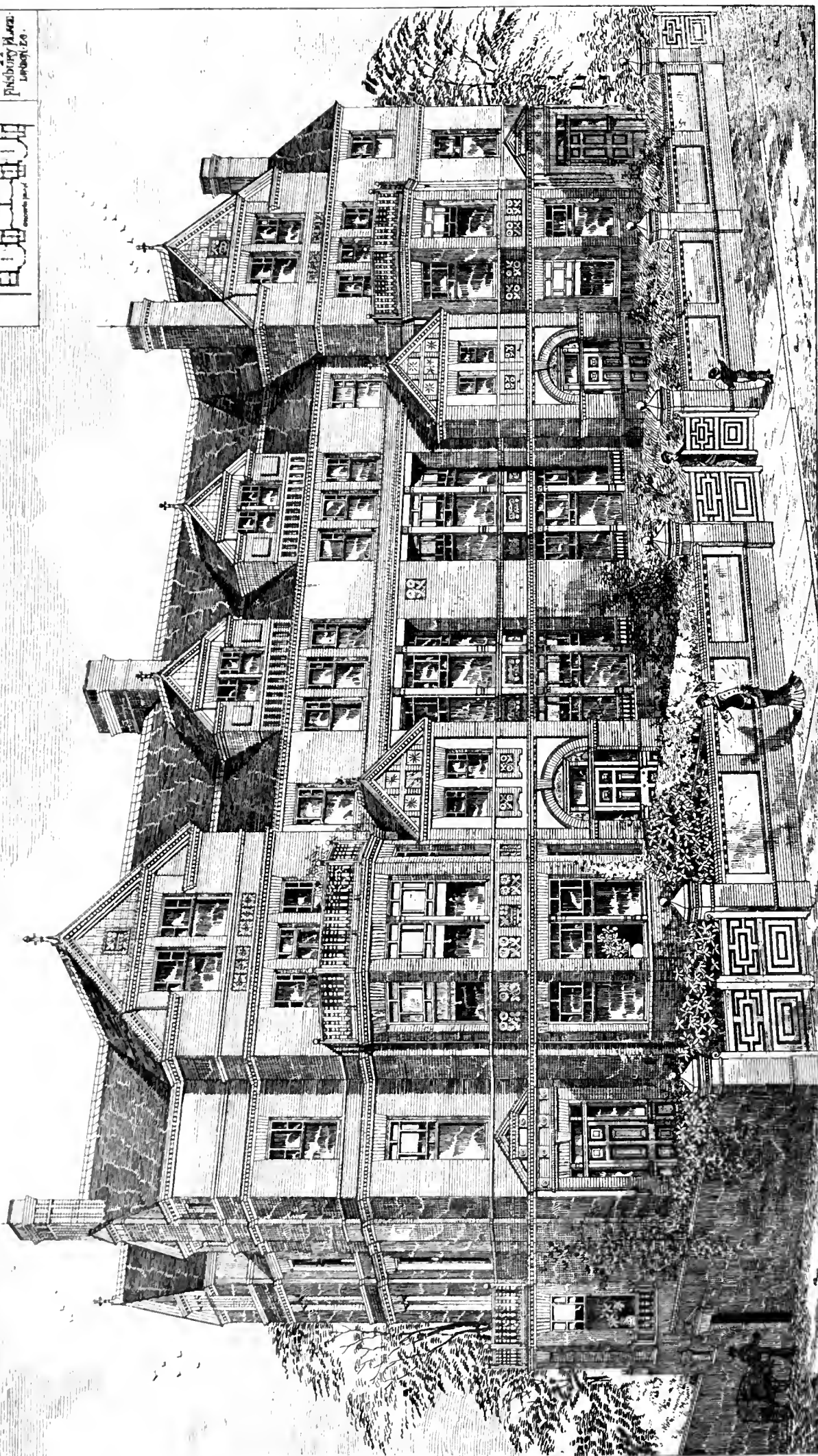
ENTRANCE GATEWAY, SOMERSET HOUSE.

WE reproduce to-day a portion of the drawings
for which the Royal Academy have just
awarded their first medal for 1878 to Mr. R. W.
Gibson. The care and spirit of these drawings
have seldom been equalled by students at the

columns are not exactly alike in diameters;
some are slightly larger at 5ft. height than at
base, but this seems to be accidental. Some of
the columns are a little out of perpendicular.
The bases to columns slightly vary in projec-
tions, but are nearly all larger than those to
pilasters. In one or two cases the face of
architrave is not quite over the face of column,
as seems to be intended. The cornices upon
walls have less projection than those to middle
aisle; other mouldings also vary. The drawings
(details) are medium examples of three or four
measurements. The curves were ascertained
by the cymagraph. The spring of vaults is not
always exactly over centre of column, but this
seems to be accidental and irregular. The
lines of vaulted ceiling decoration do not in all
cases range as intended, and the dimensions of
corresponding parts vary a little. The pave-
ments are not quite level.



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VILLAS, GREEN-HILL, HAMPSTEAD.

THESE villas, of which an illustration is given in our present issue, are now in course of erection in this favoured suburb. The style popularly known as "Queen Anne" is here treated with considerable modification, the object apparently being to retain the homely picturesque feeling, without sacrifice of light, and with economy of cost in plan and detail. The walls are faced with pressed bricks made in Leicestershire, not perhaps as rich in colour as some would desire, but selected in this instance for their good weather-resisting qualities. The strings and cornices are of moulded bricks from the same district. The roofs are covered with red Broseley tiles. Mr. Theodore K. Green is the architect.

NOS. 50, 51, AND 52, WOOD-STREET.

THIS warehouse forms part of the extensive premises belonging to Messrs. Rylands and Sons, Limited. The elevation has been considerably altered, and, as will be seen by our illustration, the old height preserved. While this has cramped the design the architects have preserved the number of stories by setting back the upper floors. A good light has been obtained throughout by the arrangement of the areas and bulkheads. The builders were

ST ALBAN'S CATHEDRAL.

I HAVE read Mr. Street's letter on this subject with interest, if not with pleasure. To my mind it savours too much of those sermons in which the preacher creates a bogie of unbelief for the mere pleasure of knocking him down. I have no intention of replying in detail to what Mr. Street urges, for I am well aware that if the controversy between us were continued indefinitely, neither would be convinced of the error of his ways; and on the whole I think it is one of those frequent cases in which it is best to "agree to differ." Nevertheless, there are one or two matters which I must take note of.

I have already expressed to Mr. Street my regret at having used the unlucky word "surreptitious," and have explained to him that in writing it I had no thought of its having reference to himself, but only to the action of an uncalled-for doctor examining a patient without his or his friends' knowledge. I did not see at the time how easily the word might be misunderstood.

Mr. Street evidently still thinks that my conduct has been inconsistent with my oft-

Sir Gilbert Scott, that the old roof should in that case be repaired, and that over it should be erected a new set of framed rafters to the higher angle, while, about the retention of the ceiling, there can hardly arise any question. Sir Gilbert's wish was, supposing the higher angle to be agreed on, to follow exactly the same course adopted by him at Selby in a parallel case. This has been perfectly successful, and may be taken as a precedent."

It will be seen from the above that, although from a feeling that this had not become a practical question, I did not urge the high roof as a "*sine qua non*," yet the bias of my opinion was all in favour of it. This report, and its supplement, dated June 25th, were read together at the meeting of the Committee held on June 29th. I was present, and, in the discussion which took place, spoke strongly in favour of a high roof being erected above the timbers of the old one, and finally the high roof was carried. The minority, however, not being satisfied, a larger meeting was called for the 10th of August. For this meeting I prepared a report, dated July 26th, giving various estimates for the high roof, which I

FIG. 1.

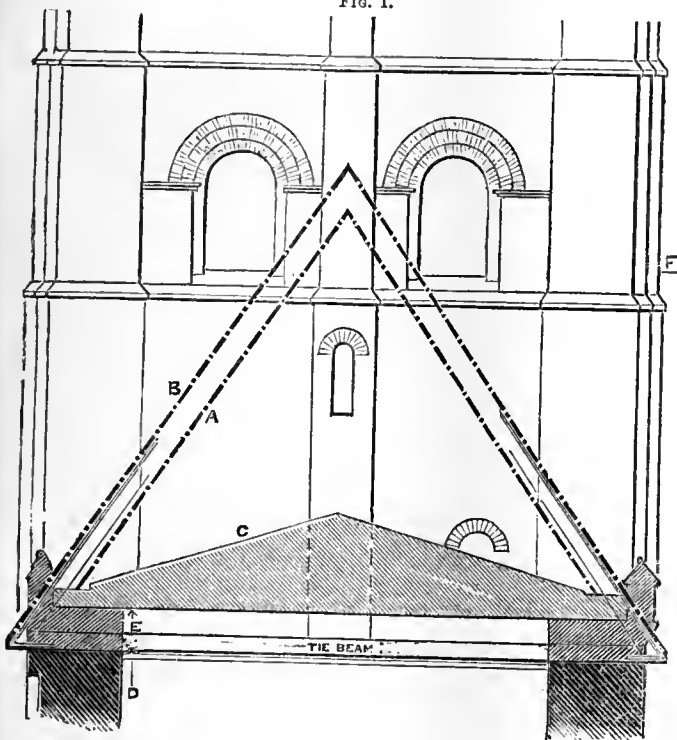
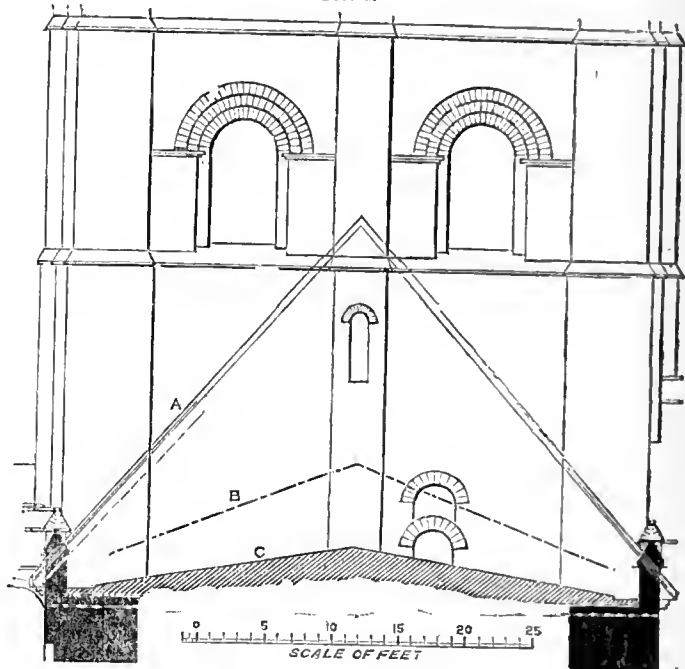


FIG. 2.



Messrs. Braid and Co., of Chelsea; Mr. James Mudie was the foreman. The carving was executed by Mr. J. W. Seal, of Walworth, and the whole was carried out from the designs and under the superintendence of Messrs. J. and J. Belcher, of 5, Adelaide-place, London-bridge, E.C.

THE ARCHITECTURAL SCHOOL—ROYAL ACADEMY.

THE following are the admissions to the Royal Academy Architectural School for January, 1879:—

1st Class Student.—W. Stevens.

2nd Class Students.—F. W. Besant, C. Bradley, G. H. Coldwell, H. Goodall, M. J. Lansdell, F. C. Lees, A. J. Murray, J. B. Phillips, L. Stokes, T. Watson, T. B. Whinney.

Probationers.—F. C. Booty, F. G. F. Hooper, W. Lane, C. P. Leach, F. W. Littlewood, W. Bessett-Smith, N. J. Stangen, T. S. Townsend.

The first stone of the monument to the memory of Lord Brougham was laid on Thursday week at Cannes.

An English Wesleyan chapel was opened at Llan-saintffraid, near Oswestry, on Friday week. The plans were supplied by Mr. W. Ranger, of Finsbury Pavement, E.C., and the builder was Mr. John Peckstock, of Meitod, near Welshpool.

quoted report of June 25th. I have been much surprised at what has been built upon this poor letter, which begins with the words, "I understand that a further report, dealing especially with the western portions of the roof, is thought desirable. As this had already been dealt with by my father I did not include it in my former letter." This is, on the face of it, only supplementary to what had been written before. As nobody seems to have cared to inquire what this was, I think it is well to quote that portion of my original report, dated June 7th, which refers to the high roof. After stating the nature and probable cost of the repairs required to the old roof and ceiling I go on as follows:—

"The next division of the subject is perhaps the most important—namely, the treatment of the lead covering. The question of the pitch of the roof at once comes in, whether to preserve the present form, or revert to the more ancient high pitch shown by the marks remaining on the tower wall. I consider that all I have said above [i.e., as to the repairs of the old roof and ceiling] applies equally to either treatment of the roof, as, if the high pitch is determined on, I think the committee will agree with the view held so strongly by

had been instructed to obtain, and ending as follows:—

"I understand that a motion will be brought forward at the meeting, the object of which is to reverse the decision arrived at in favour of a high-pitched roof. The arguments I have heard are—(1st) that the western part of the abbey having been Tudorised—as I think it has been expressed—the low-pitched roof is more in accordance with the architecture, and (2nd) that as a new higher gable will become necessary at the west end, we shall be infringing on the design of Abbot Wheathampstead. I wish to point out that, as far as the nave is concerned, no late alteration of any consequence whatever has been made, with the exception of the insertion of the west window. It is to all interests and purposes early architecture from beginning to end, and therefore a high-pitched roof, such as it originally had, will be in full accordance with its design. Besides this I wish to call attention to the fact that the gable does not form any important feature in the west front. Its design terminates in a horizontal cornice and parapet, the gable having been erected well behind this on the inner face of the wall, with a passage way between the two. In the new arrangement no alteration will be made to the parapet beyond such repairs as are necessary, and the new

gable, which should be kept subordinate to the design, will, like the present one, be in rear of the general line of the front. Another consideration is this—the three noble portals, with their lofty gables, will doubtless be restored before long. These will greatly alter the character of the west front, vastly increasing its beauty, and there cannot be a question that the gable of the new roof will be more in agreement with the new and earlier character than the depressed gable which now exists.”

The final meeting, which was one of all the large subscribers, was held a few weeks later, when, for the third time, the high roof was carried by a large majority, but on none of these occasions was I able to carry out my wish of preserving the old roof in connection with it. This, I am glad to think, has now been made possible by the action of Mr. Street and the Society of Antiquaries, and, so far, I am extremely obliged to them. I do not think I need say anything further on this point.

Although Mr. Street's opinion is opposed to mine in some respects, I am able to gather some crumbs of comfort from his letter—for instance—although at the beginning of it he disputes my higher roof mark being a roof mark at all, and calls in Mr. Neale to help him (who, after agreeing with me as to this line at the Society of Antiquaries, and more recently at a meeting of the St. Alban's Architectural Society, has, I am told, been spending day after day amidst snow and ice, measuring the tower brick by brick, in order to prove himself and me wrong), yet later on in his letter he says (speaking of my explanation of the upper and lower roof marks) that “a far simpler explanation would be that when the nave walls were raised 3ft. 6in. above the transept walls, the ridge of the nave roof was also raised 3ft. 6in. above its old line, and so produced the ‘original’ marks above the other.” From this I gather that after all Mr. Street thinks, as I do, that these upper marks do at least indicate a roof, and are not due to my imagination, as otherwise the explanation would be far more simple than reasonable. Whether Mr. Street now agrees with me or not, as to the raising of the walls, I cannot make out from the wording of his letter. I hope he does, as I consider it proved as certainly as anything resting on architectural evidence can be.

Then, as regards the artistic effect of a high roof, Mr. Street says that, if only the old timbers were rather more rotten, he could agree “in the propriety of raising the ridges of the roofs to the level at which they stood when the tower was built.” He adds: “I should do so, because at this level it would be possible hereafter to look forward to all the roofs being, as they once were, at the same level.” (Surely not that of the eastern arm, as this would involve the destruction of the choir clerestory?) If it would be an advantage to raise the roof at all, the more or less rotten state of the timbers cannot affect the artistic propriety of doing so, nor can the difference in the height (varying from 3ft. 6in. to nothing according to the view taken of the Norman ridge line), make all the difference between dwarfing the tower and restoring it to “the proportions its builders intended that it should have.” Moreover, I am not at all prepared to believe that if Mr. Street favoured the high roof, he would favour the destruction of the parapets; so that I am able to gather that he must think as I do that the appearance will, on the whole, be improved by the high roof, and that such a roof can be erected with parapets.

Mr. Street's theory of the Norman roofs finishing below the string-course of the tower is new. His diagram, exhibited at the Society of Antiquaries, certainly did not show it so; nor are there any marks on any of the four sides of the tower suggest-

ing it. The only evidence is Mr. Neale's drawing of the transept springers, and this part of the building I am now having accurately measured.

Mr. Street states, most inaccurately, that I have “taken away whatever remained of the old corbel table, &c., on the western part of the nave, and have erected a new parapet of Early English style to agree with the old work in the clerestory.” The Early English corbel table remained here before our works of restoration were commenced, as may be seen by reference to Mr. Neale's plate. This portion has been most faithfully restored, many of the original corbels being retained; but as this part of the restoration was all done before I came on the scene, it can have little to do with my theory, and so the “*reductio ad absurdum*” falls to the ground.

The proposal to restore the high roof having met with such an unexpected reception, I tremble to think what would happen if I suggested the reinstatement of the slender Hertfordshire spire, which formed a beautiful feature, probably from Trumpington's days down to the last century; but, nevertheless, I venture to say that I should like to see it restored.

J. OLDRID SCOTT.

Mr. Scott has been good enough to lend us his drawings, specially prepared to show the relative lines of the Norman and later roofs, and also giving a section of the existing roofs and parapets to the nave and south transept of St. Alban's. The following references will at once explain the sketches:—Fig. 1 is a section of the nave, with west elevation of tower; B shows the line of original Norman roof of nave, with shingles as a covering; A shows the line of the second or later roof, and the sectional part, hatched at C, shows the existing roof; D, to the section of the walling, shows the Norman wall immediately under the tie-beams of the original roof; as shown by B; E shows the section of the later work and parapets. The span is 41ft. 2in. between parapets. F shows the ridge line of the original Norman roof to south transept. This is shown by Fig. 2, which gives the south elevation of tower, A being the line of pitch of original Norman roof; B shows the roof of later date, and C the existing roof. The span is 42ft. 3in. between the parapets.

As it is impossible to answer Sir Edmund Beckett in the *Times*, will you allow me to make public in your columns the enclosed correspondence, arising out of the remark with which he concludes his letter in that paper, under the above title, as follows:—“I could say something of the third companion's probable impartiality, too; but as it has not been published by their newspaper I will not.”—ARTHUR W. BLOMFIELD.

[Copy.]

28, Montagu-square, Dec. 25, 1878.
SIR,—I have just been looking at the brilliant display of squibs and rockets with which (so far as the *Times* is concerned) you bring “the Battle of St. Alban's” to a close this morning. I notice that it ends with the exhibition of a “cracker,” directed against myself, which only half goes off. This is highly unsatisfactory, and I think I am entitled to ask you for some explanation. It appears to me extremely unfair publicly to impute unworthy motives, or to innuendo the probability of such motives, in so vague a manner as to render distinct repudiation impossible. I therefore appeal to you to state clearly by what you believe me to have been biased in the very minor part I have played in the matter. It is sometimes difficult to feel confident as to the springs of action even in one's own case, and I undertake to tell you at once if you succeed in pointing out to me any hidden motive in what I have done beyond the ostensible one of the simple wish to give an honest opinion when pressed on both sides. I am entirely unconscious of anything more at present, and I am at a loss to conceive what you can mean.—I am, sir, your obedient servant,
ARTHUR W. BLOMFIELD.

Sir Edmund Beckett, Bart., Q.C.

On a post-card, received Dec. 27, 1878.
I never re-light my public “crackers” for private exhibition, and I am sure it is unnecessary in this case.
E. BECKETT.

60, Marina, St. Leonards.
Arthur Blomfield, Esq.

28, Montague-square, Dec. 27, 1878.
SIR,—The fair inference to be drawn from your reply to my letter is that you do not hesitate to make public insinuations which you are not prepared to substantiate.—I am, sir, your obedient servant,
ARTHUR W. BLOMFIELD.

Sir Edmund Beckett, Bart., Q.C.
I shall publish this correspondence.

60, Marina, St. Leonards, Dec. 28, 1878.
SIR,—The fairer “inference from my answer” to your letter is, that if a man behaves as you and Mr. Street and Mr. Christian have done, and then besides writes privately to me about my “squibs and crackers,” he will be “answered according to his folly.” And he will get no other answer.—Yours obediently,
EDM. BECKETT.

A. W. Blomfield, Esq.

28, Montague-square, Dec. 30, 1878.
SIR,—In “answering me according to my folly” you clearly remain yourself in the other great section of humanity. Allow me, however, to remark that the roof of the nave of St. Alban's (spell it how you like) is not your private property, though you seem to think so.—Your obedient servant,
ARTHUR W. BLOMFIELD.

Sir E. Beckett, Bart., Q.C.

OBITUARY.

THE LATE TIMOTHY HEVEY, ESQ., F.R.I.A.I.—The above name closes the obituary of Irish artists for the year just passed. Born in the county Antrim in or about the year 1844, and having been educated at the Catholic College, Belfast, he was, at the age of eighteen, articled to the late Mr. Pugin (afterwards partner of G. C. Ashlin, Esq.) and having completed his pupilage he passed some years in the office of the latter in Dublin. In the year 1869 he commenced practice for himself in his native county, and with considerable success, having since then designed and superintended the erection of many churches, parochial dwellings, schools, and manufacturing establishments in the north of Ireland, which, one and all, bear testimony to his abilities as an architect. The new church of St. Patrick, Donegal-street, Belfast, is, however, the principal work with which we find his name connected. At the time of his death, which took place on Sunday evening, the 29th ult., at Albert-street, Belfast, he was in his 34th year. He leaves a widow and one child to mourn his untimely demise.

THE LATE MR. JOHN JOHNSON.—We regret to announce the death, in his seventy-second year, of Mr. John Johnson, architect and surveyor, 14, Buckingham-street, Adelphi, W.C. The deceased was awarded a gold medal by the Society of Arts in 1833; in the following year he gained the first silver medal of the Royal Academy for architectural designs, in 1835 the Academy gold medal, and in 1836 the Academy travelling studentship in architecture, with which he travelled in Italy. In May, 1841, Mr. Johnson commenced independent practice in London, and continued in the profession until his death. He was not a member of the R.I.B.A. In December, 1875, Mr. Johnson received a diploma of honour in the arts of design from the Academy of Florence. He enjoyed a large private practice as a surveyor, but will be chiefly remembered as the joint architect with Mr. Meeson of the first Alexandra Palace on Muswell-hill (opened May 24th, 1873, and destroyed by fire on June 9th of the same year), and sole architect of the present palace, which was opened May 1st, 1875. Both buildings were fully described in our columns in the months of April and May, 1873 and 1875, and the ground plan of the present structure was reproduced by us, Feb. 6th, 1874. Amongst the churches designed and executed by Mr. Johnson may be noticed the important Late Decorated parish church of St. Edward, Romford, built in 1849, and that for St. Andrew's district, Romford, opened twelve years later; St. Paul's, Camden-town; St. Matthew, Oakley-square; St. Luke, King's-cross (removed to make way for St. Pancras-station); St. Andrew, Thornhill-square; St. Mary, Greenhithe; Christ Church, Stratford-by-Bow; Holy Trinity, Wimbledon; and Midgham and Brimpton, Berks. Roslyn Chapel and residentiary, Hampstead, was built from his designs in 1867.

BUILDING NEWS DESIGNING CLUB.

REVIEW OF DESIGNS FOR SEMI-DETACHED VILLAS.

IN this competition merit of planning is not so conspicuous as we anticipated. "S" in circle, which we are obliged to place first, does not happily solve the problem given. The plan is compact in the lobby and hall arrangement, though we do not like the cramped stairs, and certainly not the winders. The kitchen, too, is too small, measuring only 7ft. across at the entrance end, and there is no copper shown in scullery. The entrance would have been better if it had been placed in a cross passage, and the kitchen beyond it. We think the dining-room also is too small. On the upper floor the plan has more merit, and in the elevation the author has certainly given us a common-sense treatment for brick and tile, the bays being carried up as gables in the roof story. The overhung doorways are rather crushed in effect. The cubing is put at 61,432ft. at 6d. per foot = £1,600. "Omega" has decided merits. The hall, stairs, and kitchen, with its window placed rather askance in the inner angle, are well planned, and the area is well utilised; the external elevation is simple, with tiled gables, but withal there is little striking or original. The skewed window is certainly better than a right-angled one in such a position. The cube contents are 54,806ft. "Yesram" obviates some of the defects common to many; the main entrance is at the side, a 4ft. passage leading direct from front to back; the kitchen is too small, but has an angle window, the scullery being made a passage room to the back. No windows, except the staircase, look upon the adjacent property, but the winders to the stairs are objectionable, and elevation falls short. Why such small windows to the drawing-rooms and study? Cubing is 61,256ft. at 7d. = £1,785. The hollow walls are good points. In "Confido" the kitchen is cramped. The window facing a tradesmen's entrance lobby is clever though not desirable, and the scullery and copper are too confined. The staircase and lobby arrangement between kitchen and dining-room and the china closet is ingeniously contrived, and but for the two restricted outbuildings the design would have stood higher. Elevations are somewhat hackneyed. The cubing is well worked out at 73d. and at 5d., and the economy of space is obvious. "Motto J." sends a very pleasingly designed elevation in Queen Anne character, but living room and parlour are cramped, and the kitchen is much too small, being only 11ft. 6in. x 9ft. A side porch entrance is shown. The objection to overlooking by side windows has been met, however, and the plan has the merit of economy in the cubing, five bedrooms being provided. "Mechlin" has solved the difficulty of avoiding side windows, and has also obtained a tradesmen's entrance behind the main porch, both at the side; but the dining-room is too small, and the elevations are somewhat commonplace. Why not have thrown the porch into the hall, instead of notching it into the latter? We observe a germ of success in the plan, but it has been lost sight of. The cube contents of each house is put down as 23,411ft. priced at 8d., = £781 per house. "Mechlin" will find he has no headway on first landing, if we judge by his elevations. "R." in circle does not comply with the condition as to side lighting. His kitchen window faces directly upon the adjoining pair. With this exception the plan has some points of merit. The hall and entrance is placed next the party wall, the dining-room to the side of this, 16ft. 6in. x 13ft. 6in., while at the back is a good drawing-room, with a bay and a lobby entrance to kitchen, with a serving hatchway to dining-room. The elevation is designed in Queen Anne style, somewhat rural in feeling. Cube contents 61,182, at 6d. "Frappe Fort" sends a vigorously-drawn perspective with some heavy chimney caps, but the ground plan ignores the condition about avoiding overlooking windows, the kitchen having one facing laterally. There is a good dining-room, and some compact planning in the lobby and outbuildings—another merit like that of "R." already noticed, is that the offices do not extend behind, and form a long range to obstruct the light and view of back windows.

The fault of "North West," as of many others, is the crowding of the hall, and the window to kitchen being placed inconveniently close to that of the dining-room. The scullery is made the back entrance, the bedrooms are conveniently planned. We do not like the elevations nor the high-shouldered appearance of the gabled sides. The cubing is taken at 7d. for the main part and 4d. for the subordinate. Among ingenious attempts to avoid side lights, we may mention "D." in triangle, who places his kitchen next the party wall, but no side passage-way is allowed, and the whole 30ft. half frontage is taken up so that the windows shown of pantry and larder are useless. "En Avant" also occupies the entire frontage, and thus places himself out of the field. "S. C. M." shows a skylight to light kitchen, which is, however, too small, as is also the scullery. The narrow stairs and winders are objectionable, but the author is on the right scent. "Fritz" has boldly departed from the stereotyped disposition of rooms, and if he had shown a better stair and larger dining-room his plan would have at least the merit of originality. He puts the kitchen close to the party-wall of the pair and by the side of dining-room. "Lbs." avoids back offices entirely, places his two sitting-rooms in front, and lights his larder and china-closet by a central court common to the pair. The plan has some merit, though the details are poorly worked out. "Franc Tireur" is an ordinary arrangement, the kitchen window facing towards the yard. Elevation has some redeeming features, at least in front. Star in circle does not meet the conditions of competition, though there are one or two good points in plan. We cannot admire the elevation, with the uncomfortably close bay windows. "Spero Meliora." The crooked office wings are not desirable, and the remedy is worse than the evil. The drawings are carefully made. The author of "Curiose" falls into the common error of cramping the kitchen, while the china-closet opening out of entrance vestibule is surely wanting in convenience. "Tam O'Shanter" transposes the usual position of parlour and kitchen, the latter being placed next party-wall; the plan is certainly more compact than many others; there is a useful serving lobby, and the sculleries outside are back to back. The elevation is below the mark. The plan of "J. S." is an economical though somewhat awkward attempt to solve the question, and the kitchen after all has a side light. The best part of the design is the elevation, which is cleverly broken and simply treated. The cubing is at 8d. and 4½d. "K" in circle fails to meet the condition; the scullery entrance facing side passage is also objectionable, and would be tempting to a gossiping servant. "Semper Spiro Spero" has little to recommend the plan, and the stairs are objectionably awkward to get furniture up—a point many others are equally faulty in. "Namor's" arrangement is not happy, though it avoids a long back office wing. "Montague" places his drawing-room on the first floor, and his kitchen and scullery are side by side below, but the poor entrance and awkward deep bay windows are defects. "Try" does not attempt any new arrangement, but his kitchen wings are obtrusive and unsightly, and spoil the garden view from the dining-room. "Cabul" is better, and his details are good. "Heval." A plan avoiding back projections, but defective in lighting and detail. "C" in triangles has an economical ground plan, but the stairs, kitchen, and dining-room are cramped. "Omnia Vincit Labor" is wasteful in passages and ill-lighted. We have only space to further enumerate in order of their merit the following:—"Octagon," "Anchor," "East Anglican," "Such a Dog," "Maltese Cross," "Ich Dien," "Amateur," "Pat," "Signum," "M in Leaves," "B. M. W.," "C. W. D.," "E" in triangles, "Ogmore," and "Peter;" the first three or four of which possess points of merit in plan. In reviewing the designs we have noted that the larger number fail in adhering to the customary plan of semi-detached villas; others have simply changed the position of windows, while a few only have boldly tried to meet the difficulty by doing away with the usual office wings and disposing the offices anew—notably "Confido," "Frappe Fort," "R" in circle, "Lbs.," and a few others. A side passage way

is useful, but its chief use is to replenish the coal cellar. "S" in circle provides for this purpose only, but others have shown a passage way through. We think a side or recessed entrance a great point, as in the first three plans, and a servants' entrance may be well made through the scullery or a lobby between kitchen and hall. No plan, however, we have received has successfully met the condition proposed. The dining-room, hall, or kitchen, has in most cases suffered by the attempt, and few of the authors have availed themselves of a middle area for lighting a portion with any success. The details received are not equal to the occasion. Those of "Cabul" and "Frappe Fort" are the best, after which "Try" may be placed. "Spero Meliora" shows lack of experience, or he would never have designed such a wooden bracket as he has to his doorway. His brick architrave also is much too wide and out of proportion, and his gates and posts are too full of cross boarding and stop chamfers. Details by "Such a Dog" are wanting in knowledge of mouldings and precision of drawing. In concluding this review it must not be supposed that we have entered minutely into the construction and detail of the various designs submitted to us. If we were to do so our task would be an endless one for ourselves and wearisome to the patience of our readers, while the main object of our criticism would be lost—namely, the inculcation of sound principles of general planning and good design.

SUGGESTIONS RELATING TO PLANS, MAIN DRAINAGE, AND WATER SUPPLY.

THE Local Government Board have just published, in official blue-book form, some information that should have been made known years ago; but as the old adage says, "It is better late than never," we welcome the revised pamphlet before us of "Suggestions," by Mr. Robert Rawlinson, C.B., C.E. These include information relative to maps and plans of districts to be submitted when sanction is required for loans and other purposes of the Public Health Act, as well as information respecting works of main sewerage and water supply. The appendices are quite as useful to the town surveyor. They furnish suggestions as to contracts and specifications, instructions as to applications, schedules of prices for well-sinking and boring, table of prime cost of machines for raising water, regulations for house fittings for water supply, specimens of plans, &c. We will here briefly give the gist of the more useful suggestions relating to main drainage. As to boundary maps it is stated "in cases in which a local government district or a special drainage district is proposed to be formed, a map should be submitted, accompanied by a written description of the proposed boundary clearly defined." The area in acres has to be given with the population and number of houses. The rate of increase of population, and a duplicate of the map on tracing cloth, are also required. Ward maps should have the main boundary distinctly defined thereon, and the proposed division into wards, taking advantage for such boundaries of brooks, roads, foot-walks, streets, or fences, such lines to be defined by margins of colour, with the names, areas, populations, and rateable values of each ward. Upon application being made for loans, plans (or tracings), sections, detailed estimates, and specification are necessary, accompanied by information as to population at the two last periods of taking the census, the rateable value, and the amount of outstanding loans. Lines of main sewers and drains should have the cross sectional dimensions and the gradients marked upon them, the dimensions of water and gas-pipes being also shown. A specimen plan is given which will be found useful. It shows red lines for sewers, small circles of red for manholes, ventilating or flushing chambers, brown lines for pipe sewers, either double or single, according to size, blue lines for iron pipes, and the flow of sewage is indicated by an arrow. It is stated that no general map should be submitted which is drawn to a scale of less than 6in. to the mile, except when the inch ordnance map is used. For showing sewerage or water works, or street improvements, maps should not be less than the ordnance scale of 1-2,500th. Detail plans are to be in a scale of

not less than 10ft. to a mile, the houses, bench marks, levels of streets and cellars, high and low tide level, &c., being shown; and 8ft. x 2ft. is suggested as a convenient size for sheets. A specimen of this plan is also given. Enlarged details of sewers, manholes, sluices, &c., are, to be not less than 8ft. to the inch, or to any larger scale. Engraved or lithographed diagrams are also accepted.

Referring to the suggestions some valuable points respecting main sewers are given. It is hinted they should be laid at "such depth as will effectively drain house basements, and, when practicable, not less than twice the full diameter of the sewer below basement or cellar floors, to prevent house drains from being back-watered. Drains from basement to sewer should have a clear fall of not less than 1 in 60, and should enter sewer by a junction specially provided for that purpose." Sewers and drains on sites liable to be flooded require to have outlets with valves, to prevent floods back-watering the sewers. Tidal flap valves are illustrated, also penstocks for sewers. Plate 18 shows a self-acting overflow valve hung on pivots, so hung as to close against flooding. Street surface ventilation, it is pointed out, cannot be provided below the surface flood level: they must therefore be ventilated above. No. 3 suggestion states, "Main sewers must not be of capacity to contain flood water of the area drained, as such flood water should be passed over the surface, or by special channels and drains." This condition seems to be desirable on the score of economy, though we believe that special flood-water drains are seldom thought of. In the laying-out of main sewers straight lines and true gradients are recommended, the chief changes of line and gradient being provided for by side entrances, manholes, and flushing arrangements. A section of manhole and ventilating shaft is given (Plate 4), the latter being independent and not so deep, with a coarse gravel bottom for draining, and a charcoal basket in a vertical opening between the two shafts. Another diagram exhibits a system of ventilation that has been found successful. It shows the usual manhole and shaft, with a close movable iron cover at the street level. Two charcoal baskets are placed across the shaft, through which the sewer gas percolates and becomes disinfected, above which it passes into a side ventilating chamber, and thence through a grating in the street. Any solid matter falling through can be removed by a slide at the lower end of chamber. Speaking of the duplicate system of sewerage, Mr. Rawlinson says it is seldom required, and existing road drains may be retained for storm waters. He states objections to the double system, but these have been answered before, and do not take into consideration the principle of making a separate drain the channel for an excess only of rain-water. A separate system, we assert, would not entail two sets of drains to the houses, as the house drains would be single as at present. House drains are recommended to be laid in concrete, and if the subsoil is porous the trench should be lined with clay puddle. For the jointing of pipes concrete or cement is suggested in preference to clay, though to the second material we have strong objections. At junctions and curves an extra fall to compensate for friction is advised, and when two sewers of unequal diameters join, the lesser sewer should have a fall into the larger equal to difference of the diameters. We have no space to recapitulate other suggestions, many of which are obvious and well known. We may mention, however, that house drains are recommended not to pass direct from sewers to the inside of houses, but they should end at an outside wall. Sinks and closets should be also against outer walls, and be discharged into ventilated traps. Down spouts are not to be used for ventilation as the heads may be near windows, so that the open soil pipe system cannot be enforced under this rather unnecessary rule. Side junctions are to be provided for house drains. Back drainage is recommended on the right-line system from manhole to manhole. On the question of sewers in hilly districts, Mr. Rawlinson recommends sewerage in zones, or by intercepting lines of sewers contouring the site, as they prevent gorging the low-level districts, and the rush of sewage down steep gradients, which in times of

heavy rain may burst the low-level sewers at the steep junctions. Steep sewers require to be better ventilated than flat ones to prevent dangerous accumulation of gas in the upper districts, and the arrangement already described of ventilated manholes is proposed, with "tumbling bays" between the two levels. Tide-locked sewers must be constructed so that the lower portion below the level of high water or land floods of a river should be cut off from the upper portions and be amply ventilated, and a section of an arrangement for a main outlet on seashore is given with a manhole ventilating chamber, a hinged flap valve to outlet sewer, also a flood-water overflow. We are glad to find trapping not advised in cases of offensive sewers, but additional openings for ventilation, and another good hint is that single ventilating tubes are useless. There should always be two—an inlet and outlet—or the single pipe should be divided by a diaphragm. A little more classification in the suggestions would have been desirable, as we find the same branches of the subject are repeated. In the chapter on "Water Supply," a few useful hints are given. Thus it is advised that cast-iron pipes should be coated inside and out with black varnish. Turned bored joints are said to be cheapest, but lead joints are safest. Specimens of tanks are given, and these may be of brick or concrete, made water-tight by clay-puddling the bottom, and concreted, the thickness of puddle being not less than 12in., and spread evenly over the whole surface of site. Into the part on "Sewage Disposal" we have no space to enter here, and as to the appendices we may profitably refer to them on another occasion. Mr. Rawlinson's "Suggestions," if they had been published years ago, would have saved many useless labours on the part of town surveyors, and expensive failures, but though it has appeared late in the day it will be found a useful guide to the profession.

The total depth of the artesian well being bored for the Vestry of Richmond, Surrey, is now 355ft.; the last 100ft. are sunk in the chalk, and the contractors are confident of obtaining sufficient water before reaching the maximum depth—415ft.—prescribed by the contract. Messrs. Ross and Mions are the engineers.

The Local Board of Civil Works, Wilts, have decided to apply to the Public Works Loan Commissioners for a loan of £5,000 for carrying out works of sewerage.

At Marlborough-street police-court, London, on Monday week John Clarke, clerk to a builder of Chapel-street, Mayfair, was sentenced to a month's imprisonment with hard labour, for stealing £3, given him by his employer to pay for advertisements in a newspaper.

A new stained glass window has been placed in the chancel of All Saints' Church, Hnningdon, during the past fortnight. It is in three lights, and represents the Lord's Supper. Our Lord, portrayed in the act of blessing the bread, occupies the centre light with six of the Apostles on either side. Through the window is seen a distant view of Jerusalem by night. The work was executed by Mr. W. H. Dixon, of London and Sheffield. All the chancel windows in this church have now been filled with stained glass.

The Wesleyan chapel at Redwick, near Bristol, was recently reopened after considerable alteration and improvement, carried out from the designs of Mr. Herbert J. Jones, of Bristol. A school for 60 children has been erected at the rear of the chapel. All the internal fittings in the latter building have been removed and replaced by a rostrum and open seats, all framed in pitch pine with white deal panels. The contractors were Messrs. Lewis and Edbrooke, of Bristol.

A stained glass window has been placed in the south transept of Hereford Cathedral to the memory of the Rev. John Goss, vicar of St. John Baptist, Hereford, and son of Sir Joseph Goss, organist of St. Paul's Cathedral.

At Ayot St. Peter's, Herts, a novel use of Rust's mosaic has been made in its application to the face of the new clock which has been given to the church. The centre is composed of gold colour scrolls upon an azure ground, and around this is a belt of circles of white, bearing the figures of the hours in black, and the spandrels are alternately dark blue and ruby. The work has been carried out from the designs of Mr. J. P. Seddon, who was also the architect of the church itself.

A new church is about to be built at Peel, Isle of Man, from the designs of Messrs. Charles Barry and Son, of Liverpool, and in counterpart of a church recently erected by them at Bolton.

Building Intelligence.

ABERFORD, NEAR LEEDS.—Alterations have been going on at the Catholic chapel of Aberford, and are now about approaching completion. The sanctuary has been re-decorated, new reredos to high altar, new Lady altar, new sanctuary fittings, which have been supplied from Birmingham. The nave has also been decorated, and new seats have been supplied, and a new porch and wind porch. The chapel had for some time been in want of repair, and Mr. M. W. Lewis, architect, Stonegate, York, was instructed to prepare designs, and the work has been carried out under his directions.

CARLISLE.—Messrs. J. A. Tomlinson and Co.'s Nelson-street Works, Denton Holme, Carlisle, are now completed. The machinery and fittings are also ready for starting to run. The loom shed is about 133ft. square, and contains 322 looms, and is so planned as to be easily extended. The warehouse block, measuring 184ft. x 34ft., and three stories high, is placed to the front, being somewhat ornate, and contains long rooms for beaming, warping, sizing, &c. The engines and boilers, chimney (100ft. high), mechanics' shops, twisting block, stables, &c., comprise a block of buildings on the right hand of loom shed. The work has been executed by Messrs. C. and J. Armstrong, contractors, at a cost of from £8,000 to £9,000, exclusive of land and machinery. The engines and boilers are by Messrs. Pratchitt Bros. Mr. John Allan has acted as clerk of the works, and the whole has been carried out under the superintendence and from the designs of Messrs. Hetherington and Oliver, architects, Carlisle.

CARLTON, NEAR NOTTINGHAM.—New board schools were opened on the 30th ult. They are in three departments, each having a main room 51ft. x 20ft., and two class-rooms 20ft. x 15ft., with porches, cloak-rooms, and lavatories. The rooms are 16ft. high to plate, roofs open, timbered with arched principals. The walls are boarded 5ft. high, with inch rustic boarding, stained and varnished. The schools are Gothic in character, and are built of copper-mould bricks, with Bath stone dressings. A bell turret forms a conspicuous feature. There is a master's house, with large board room, and also a caretaker's house. The schools are heated by hot water. The works have been executed by Messrs. William Key and Francis Cave, of Carlton, at a cost of £5,295, from the designs and under the superintendence of Mr. Robt. C. Clarke, architect, Nottingham.

ECCLESTON.—New schools and master's house have recently been erected at the cost of the Duke of Westminster, at Eccleston, Cheshire. The whole of the walls are of red sandstone, and the roofs are tiled. The windows in the school are of a Gothic character, with stone tracery, and are filled with ornamental lead glazing. The gables of the house and the upper part of the walls are of black and white timber framing, which gives it a distinctive Domestic character. The most striking feature outside is a lofty stone bell turret, which is carried up one angle of the school, and contains a circular stone staircase, and above, the bell. The principal gable of the school terminates in a canopied niche, which contains in sculpture the old legend of King Alfred teaching a child to read. Eccleston school is perhaps the handsomest and most complete of all the six schools upon which the Duke's liberality has lately been engaged in this neighbourhood. All these have been from the designs of Mr. John Douglas, architect, of Chester.

TRURO.—Last Friday a new Methodist chapel was opened in Kenwyn-street. It is in the Early English style, and is capable of seating about 326 persons—236 on the ground-floor and 90 in an end gallery. The pews have solid ends and reclining backs, and in place of a pulpit there is a rostrum of ornamental design. In consequence of the peculiar situation of the building the light at the sides is very limited, and a clerestory has had to be added. The light thus obtained pervades the whole building. The facade is faced with granite pillars. The architect is Mr. J. Williams, of Knightsbridge, and Victoria-chambers, Derby.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.] All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C. Cheques and Post-office Orders to be made payable to J. PASMORE EDWARDS.

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J. N. BLACKPOOL. (Mr. Riddell's "Artisan" is to be had in this country only of Mr. F. Ship, 9, Church-road, Homerton, London, E. Mr. Ship has written us that he expects a larger consignment of copies daily, and that when they arrive the book will be advertised.)

"BUILDING NEWS" DESIGNING CLUB.

J. H. D. Tunbridge Wells. (In reply to your application we are constantly being asked for the same information, and again reply that conditions of the club were published in the BUILDING NEWS of September 20 last, copies of which may still be had on application to the publisher.)—EAST ANGLIAN. (I. Yes, if they are deserv- ing. 2. Your suggestion may be considered. We think it would be an advantage to adopt such an arrangement in the case of the more diligent and able of competitors.)

Correspondence.

THE CHAPTER-HOUSE AT ST. PAUL'S CATHEDRAL.

To the Editor of the BUILDING NEWS.

SIR,—We have most of us read with immense pleasure and profit Mr. Edmund B. Ferrey's interesting work upon Old St. Paul's. An article has appeared recently in *Notes and Queries* relative to the chapter-house, from which an extract or two may be acceptable to your readers. The original chapter-house, according to the best authorities, stood west of the south transept, but the present one, as many may remember, is in St. Paul's Churchyard, north of the Cathedral. It is a red-brick building, designed by Sir Christopher Wren, and its erection was completed, according to the Fabric Rolls, in June, 1712—i.e., some two years after the completion of the new Cathedral itself.

The first chapter-house was undoubtedly destroyed with the rest of the Cathedral, and hence from 1666 till 1712 some other one was used. This is generally supposed to have been upon or near the site for the present one, for

frequent references are made during the period mentioned to the chapter-house on the north side of the yard. Indeed, in Mr. Crace's new work, "A Catalogue of Maps, Plans, and Views of London, Westminster, and Southwark," a view occurs of a prior one on that site, drawn by "J. Harriadel, and sculptured 1668." It was therein that, in James II.'s time, Dr. Johnson, chaplain to William, Earl Russell, was solemnly degraded by a trio of bishops.

The cost of the present chapter-house was a trifle over three thousand pounds, and these are the details of the account:—

	£	s.	d.
Thomas Scott, brickmaker	37	0	0
Richard Jennings, carpenter	776	9	2
Richard Jennings, for labour	20	0	0
Richard Billingham, bricklayer	483	15	1½
Richard Billingham, for labour	30	0	0
Edward Strong, mason	728	16	4
Edward Strong, for labour	138	6	6
Thomas Robison, smith	195	11	8½
Joseph Roberts, plumber	405	12	6
John Hopson, Esq., joiner	216	16	3
Total	3,092	7	7

Is it not probable that the "John Hopson, Esq.," alluded to may have been Sir Christopher's clerk of the works? About the commencement of the chapter-house's building Jennings, the carpenter, got into hot water with the dean and chapter, it seems, and proceedings were taken against him on March 20, 1710. The reason for this is explained in Elmes's "Memoirs of the Life and Works of Sir C. Wren." He states there that:—

Mr. Jennings left the work he was upon in the church (St. Paul's) unfinished, and of a sudden dismissed all the men, and then immediately employed such of them as would comply with him in the work of the chapter-house.

Here are some further details concerning the price of materials and labour:—

Place bricks, 14s. per thousand.
Rubble bricks, 30s. per thousand.
Grey stocks, 20s. per thousand.
Carpenters erecting scaffolding, 2s. 6d. a day.
Bricklayers, 2s. 6d. a day.
Masons, 2s. 6d. a day.
Masons' labourers, 1s. 6d. a day.
900ft. of stone sawn for the job at a cost of 6d. per foot.

In the present unsettled state of the labour market these latter prices, throwing light as they do upon the cost of material and labour one hundred and sixty odd years ago, is of exceptional interest.—I am, &c.,

Exeter, Dec. 30, 1878. HARRY HEMS.

CUSTOMARY PERCENTAGE.

SIR,—I am much obliged for the result of the experience of your correspondents confirming the quantity surveyor's commission charges, about which I solicited their opinion.

"Every labourer is worthy his hire," and I am one of the last that would with parsimonious hand dole out a mere pittance for services rendered; apart from the innate feeling prompting the action, my experience teaches me the advantages that accrue from remunerating according to deserts—pay a man well, and you are more likely to obtain a just return for his wage.

I say, then, if quantity surveyors are indispensable adjuncts to contracting, let them be recognised as such, and paid commissions in proportion to their utility and essentiality; it is not so much the amount of percentage they claim as the sinister way in which they are made (by some of the profession) that I object to. If they are correct, and surveyors can prove their entitlement to them—be they 2 or 5 per cent.—why should they be disguised? Why should not those charges appear on the face of the accounts, so that clients may know that such service being needed, they have full value for their money? By the system now practised their eyes are blinded to the fact.

The case to which I alluded is—must be, I am sure—an exceptional one, and when I tell your correspondents (one of whom speaks of their fees being "hardly earned enough"), they will think so, too—that a clerk's week's work earned for the principal £230 on "omissions;" that five or six weeks' application secured him another £1,000, for measuring and making out the accounts; that a further sum of £700 was derived from making out the day-work

accounts, the whole being the produce of one contract, irrespective of commission on "bills of quantities."

One of your correspondents considers it of primary consequence that the "client's interest, in any case, should be protected." Whether such inference may be drawn from the architect sanctioning his employers being saddled with such augmented cost of their work, as the above shows, I will leave your readers to decide.—I am, &c., A. CONSTANT READER.

BELHAVEN CHURCH, GLASGOW.

SIR,—I am anxious to take the first opportunity of calling your attention to a strong case of likeness between two designs.

If you will refer first to the "Belhaven Church, Glasgow," Campbell Douglas, E. Sellars, architects, in your last number, dated Dec. 27th, 1878, and then turn to your issue of January 10th, 1879, illustrating "The English Church at Lyons," by R. Norman Shaw, A.R.A., no doubt you will be struck, on comparison, by the similarities which have prompted me to write to you. To wit: general grouping, flat-buttressed gable-end lancet windows, parapet above, low arcade below, and still lower plain wall surface. See the similarity between the start of the saddle stones for the gable crosses, and then follow the coping stones of the minor gables down to their bases. Is it not curious that there they die in both designs on to the outer side of a gabled buttress head? If Mr. Shaw ever had a peculiarity in design this feature certainly is his.

I could go much further, and point out other coincidences (compare in passing the entrance doors, above them the deep horizontal coping, and higher still the transept), but I think enough has been placed side by side to show you that, although Belhaven, Glasgow, is a long way distant from Lyons, there is a flower common to both, from which the honey of the "motifs" of these designs has been extracted.

I use "motif" advisedly, as in the different parts, where likenesses have been detected, distinctions, alterations, and changes of detail have been introduced.

There is also some similarity in the etching of the drawings—for instance, the lead-work of windows. While on the subject of drawing how comes it that in the Belhaven drawing the room on the extreme right of the view is shown polygonal, and in the plan is semi-circular? I must say that I cannot put in any claim here of similarity for Mr. Shaw. In conclusion I should like to know what the gable wall of the transept stands on. I see nothing in plan which would carry it in true perspective.—I am, &c., WYKEHAM.
December 31st.

ELECTIONS AT THE A. A.

SIR,—Your correspondent, Mr. Leaning, does not, I think, quite fairly indicate the question at issue in connection with the recent discussion. It is not so much "whether the plan of voting by ballot should be retained or not," as whether the elections should be a sensible reality or a farce—we might perhaps say, whether any form of election at all should be retained or not. It is surely somewhat late in the day to bring forward the old oft-explored objections to the ballot, and as they have been answered so many times by those who struggled for its introduction into the political world, I need not attempt to combat them in your columns.

The very existence of any form of election implies that the power of rejection as well as of acceptance is possessed by the electors; but if this power must never be exercised, it practically ceases to exist, and the form of expressing acceptance may as well be dispensed with altogether.

Something further is also surely implied in a form of election—viz., that the electors are individually capable of deciding upon the merits or qualifications of candidates, and Mr. Leaning will kindly tell us that a pupil who has been only, say, a month in an architect's office, and who has perhaps never previously attended the Association meetings is entirely competent to decide whether certain other students do or do not comply with the necessary conditions. If we are told that no candi-

date should be brought forward without the special sanction of the committee, thereby insuring, to a certain extent, his fitness, that is exactly what we have argued for; but if those who object to the ballot were consistent, they would think any form of election, after the approval of the committee, to be unnecessary. Indeed, it has been stated that to reject a candidate who had the committee's recommendation would be to indicate a want of confidence in their judgment, and might lead to their resignation. If so, why not do away with the form of election by the general body of members? It would have become an absurdity and waste of time. However, it would, we think, be desirable that in addition to a careful scrutiny by the committee, all those members who might be reckoned among the senior or more prominent ones, should have the power of acceptance or rejection, and the society is too well established to be frightened at the bugbear of "class prejudice." The two classes of members do actually exist at the present time, though without a distinct line of separation, and it is idle to talk of "equality" between a pupil of a month's and a practitioner of forty years' standing. The argument about subscription is equally beside the mark. The junior members get a far larger share (if not all) of the advantages than the senior members, who, in addition to their subscription, give their time and assistance in many ways towards the studies of younger men; but we have not heard of the seniors claiming exemption from the annual payment on the ground that they get nothing in return. The greatest possible advantage will result from the full discussion of the whole subject, but, in the first instance, it should be rather upon broad general principles than minute points of detail, which may well be left to the consideration of the committee.—I am, &c.,

WILLIAM SCOTT.

The foundation stone of new works of sewerage were publicly laid last week at Bygrave-mead, Miteham, Surrey. The works are being carried out for the Croydon rural sanitary authority, by Mr. Baldwin Latham, C.E., and are expected to cost about £50,000.

It is about five years since Bangor Cathedral was reopened after the restoration of the choir and transepts at a cost of more than £20,000. The Dean and Chapter are now desirous of making a fresh effort to restore the nave and side aisles, the chapter-house, and cathedral yard, works which it is hoped to effect for £6,000, leaving the erection of the tower to a future date. The concrete floor of the nave and side aisles, which was only laid down for temporary use in 1873, is already beginning to give way.

Within the last few days the London and North-Western Railway Company have sapped up the only portion left of Northampton Castle. The local engineer, Mr. Trench, has kindly suspended the removal by gunpowder of these massive remains until Sir Henry Dryden has taken drawings and plans of the doomed piece of masonry. Meantime the people of the county are sending an earnest memorial to the chairman and directors of the company, to request them, if possible, to save this last relic of a building so rich in historical associations.

The Church of St. Mary-at-Hill, Eastcheap, has been scheduled by the Inner Circle line in the scheme receiving Parliamentary sanction, though they do not propose to go nearer to the site than 75ft., the widening of the thoroughfare also at this point not coming within 15ft. The rector will oppose the scheme.

The chancel of the parish church of Nether Swell was enriched on Christmas Eve by the insertion of stained glass in a double lancet window on the north side. The subjects are the Agony and Betrayal of the Saviour. The work has been executed by Messrs. Clayton and Bell, of London.

Mr. John Chapple has been appointed consulting surveyor to the Dean and Chapter of Rochester—an office which he will hold in addition to that of clerk of works at the Cathedral of St. Alban's, where the works for the past eight years have been under his supervision.

At a special meeting of the Corporation of Taunton, held last week, it was resolved to invite the Royal Archaeological Institute to hold its meeting for 1879 in Taunton. A reply has since been received from the institute accepting the invitation, and a local committee is being organised to make all arrangements for the autumnal congress.

Mr. Martin Humphrey, builder of Helmdon, near Bantry, was killed while crossing the Great Western Railway near his home on Christmas-eve.

Intercommunication.

QUESTIONS.

[5624.]—**Tiled Roof.**—A builder who is putting on a tiled roof has it specified that the tiles be laid to a 2½ in. lap. Which is usual, to measure lap from pin-hole or from head of tile? The experience of some of your readers on this point would oblige.—ST.

[5625.]—**Rendering Wood Incombustible.**—Is any process known whereby wood can be made incombustible? The process, of course, must be such that its effect will last, and not be so expensive as to prohibit its adoption when the wood so treated is to be used in large quantities.—W. X.

[5626.]—**Hollow Walls.**—In building a 14 in. wall hollow may I ask it is considered better to place the 9 in. or the 4½ in. thickness on the outside of the hollow space? Will tile hanging on the outside of a 4½ in. wall keep the upper story of a dwelling-house dry? In the case of the half-timbered work, of which there is now such a revival, is it considered that a 4½ in. brick flat between the timbers, if rendered in cement on the outside and fastened on the inside, will keep out the damp?—W. R.

[5627.]—**Fir Timber.**—Can any of your many readers experienced in the timber trade define the meaning of the term "fir" in a bill of quantities where the specification preceding same distinctly states that all timber, unless otherwise specified, to be "best quality Baltic red wood," and in giving quantities of rafters, &c.—say 100ft. lineal, 4½ in. x 3 in. "rough fir" rafters—what sort of timber would it imply? Could the term be construed to mean spruce fir? Any information would oblige.—TIMBER.

[5628.]—**Marble Floor.**—I have been asked to give an opinion respecting the decay of a marble floor. Perhaps some reader will kindly help me. The floor has been laid about two years, and has now the appearance of fretting away and getting shaly in places—more particularly in the black, dark green, and red. The Sielhan jasper used is worst of all. The floor is laid on, I believe, a bed of Portland cement, and has been regularly cleaned with turpentine, as directed by those who put it down. Has this anything to do with the decay? Some of the marbles are quite untouched; in others it seems as if the stopping used by the polishers had come out.—A. K.

REPLIES.

[5616.]—**Expiration of Articles.**—Nothing further needed or usual beyond an endorsement—"Duly served and to my satisfaction. Signed 'A. B.'"—B.

[5618.]—**Etchings.**—The best frame for etchings and prints is one made of oak, flat on face, the edges being chamfered or moulded, and a flat gilt margin inside. Most of the best etchings and monochrome drawings—such as those of the old masters in Grosvenor Gallery—are so framed.—G. H. G.

[5619.]—**Surveyor's Practice.**—"Surveyor's" valuation of the matter he names would, for all practical purposes, be utterly valueless, and of no weight whatever; except in case of a decision as arbitrator, where he would probably adjudge on evidence laid before him. It would scarcely pay to take out appraiser's licences for purposes of this kind; his valuation might be challenged for absence of the licence, but there would be so many other valid objections raised that he could afford to risk this one.—B.

[5620.]—**Levels.**—In setting out depths of drains the best plan is to fix plugs or as they are called "sight-rails," along the centre line of road, and to mark the depth of invert on them at the several points. The sight-rails may be fixed to represent the run or inclination of the sewers, and thus it is easy to determine the several depths below surface of ground. Care is required that these bench marks are not liable to disturbance on account of the excavations or from settlement of ground, and many sewers and drains have suffered in correctness from this cause. On this account they should be firmly fixed in immovable ground.—G. H. G.

[5621.]—**Strength of Timber.**—The question of "J. A. A." is one that has been answered so many times in the BUILDING NEWS that it would be better to refer to back numbers than to reply *de novo*. As it happens, however, the question appears in the same number as the rule. I refer "J. A. A." to the "Commonplace Column," page 708, where he will find rules that will enable him to find the depth of girders, binders, and joists. A table of scantlings is also given.—A SUBSCRIBER FOR YEARS.

[5623.]—**Compensation for Use of Party Wall.**—It would appear from the railway company having flagged close to the party wall they have forfeited their right to the strip of ground. If the company do not set up their right within a reasonable period their interest will cease. It would be unsafe, however, to build shops till such a period has established year right.—A SURVEYOR.

Our Office Table.

THE certificates gained by students at the Crystal Palace School of Practical Engineering were distributed on Saturday week by Mr. Harrison Hayter, Mem. Council Institute, C.E., who, in addressing students and visitors, gave it as his opinion that during the present distress engineers were fully employed and better off than the members of most professions. He advocated the system of pupilage, and the necessity of becoming acquainted with practical engineering before going into the civil engineering department. Too many went from a grammar school to a university before entering an engineer's office, and then were highly educated and too old to undergo the drudgery and dirty work necessary for practically understanding the mechanics of their profession. As to the future of engineering he thought railway works were overstocked, but amongst the branches which were not so well filled he cited dock, harbour, water, and gas works, drainage, irrigation, and "electrical engineering." He urged those contemplating entering the profession to take up some speciality—one or two subjects at the most, and not to attempt to grasp all engineering subjects. The essentials of success in the profession he epitomised as indomitable perseverance, honesty of purpose, a knowledge of "how to deal with men," and, lastly, a thorough knowledge of the profession.

THE frost of last week seriously damaged one of the main pillars of the High-level Bridge, Newcastle-on-Tyne. These immense supports are square tubes of more than a foot in thickness, and have iron rods 3 or 4 inches in diameter running down the centre. During one of the recent thaws the water seems to have filtered into the top of the pillar from the level of the railway, and to have collected at the base, the frost afterwards transforming it into a block of ice, which up till Tuesday was about a foot in depth and of the full width of the interior of the column, which had moulded it into its own shape. The expansion resulting from the changeable state of the weather gave such tremendous force to the ice that it burst away the pillar from near the roadway of the bridge to about 3ft. in height. Immediately the event occurred the engineers of the North-Eastern Railway Company inspected the damage, and a temporary wooden support was erected by the side of the original pillar until it could be repaired or replaced.

THE construction of the Lewes and East Grinstead Railway is being actively proceeded with in the neighbourhood of West Hoathly, particularly the tunnel under the Sharp Thorn Ridge, which is about half a mile in length. Five shafts have been sunk for the purpose of expediting the work underground, and at each shaft is an engine for hoisting and lowering workmen and materials. The preliminary drift-way is almost completed from one end to the other. The tunnel passes through a very hard dark blue clay, of the Wealden series. The end is expected to be completed in about two years. Mr. John Wolfe Barry, M.I.C.E., of Westminster, is the company's engineer; Mr. John Robinson, M.I.C.E., of Newick, the executive engineer; and Mr. Firbank, the contractor.

THE new Act to consolidate and amend the law relating to factories and workshops came into force on Wednesday. It is a long Act, containing some 107 sections and several schedules, with numerous regulations to carry out the new law. It is divided into four parts. The first has reference to the general law relating to factories and workshops, including the safety of machinery, the employment of children, and the meal-times appointed. The second part relates to special provisions of particular cases, and the third part to administration, penalties, and legal proceedings under the Act. The fourth part has reference to definitions, and to the repeal of nearly 20 statutes and parts by the new law. There are various provisions as to holidays and the employment of young children. Considerable powers are conferred on inspectors to enter all factories. A notice in the *London Gazette* of Tuesday night defines the words "attendance at school" in the 23rd section of the Act as meaning the

attendance of a child at a morning or afternoon meeting of a school during not less than two hours of instruction in secular subjects.

THE Paris correspondent of the *American Architect*, in the course of some interesting notes on the buildings at the late Paris Exhibition, in the Christmas number of that journal, makes the following remark upon the house erected from the designs of Mr. T. E. Collcutt, F.R.I.B.A., in the Rue Internationale. He says:—"I happened to see a perspective drawing of this house front at the Academy Exhibition* in London. The drawing was prettier than the house, and the house had more quaintness and character than the drawing. The drawing seemed made by one who was rather an artist than an architect; the house was made by one who seemed rather an architect than an artist." We question the orthodoxy of this attempt at defining the difference between an artist and an architect. We have certainly never seen a perspective drawing by Mr. Collcutt—so cannot say what he may be able to do in the way of pictures, but his designs are certainly the work of an artist. Few architects are able to make good perspectives, but some of them, at any rate, are artists nevertheless. The same journal says: "Most of our readers have some familiarity with the name of Sir Edmund Beckett, the thorn in the side of our profession in England. It is not a great while since the Royal Institute of British Architects undertook to weave their thorn into a crown by electing Sir Edmund to their new grade of Hon. Associate. This might have seemed to outsiders an indication of change of heart on his part, but it was said to be a simple act of propitiation. It would appear that, as propitiatory acts are apt to be, this was fruitless, and the thorn continues to grow inward." We believe it is generally thought that the R.I.B.A. are afraid of this "active tormentor of architects," and we are glad to see that some of the better known members have spoken out, as in our correspondence columns to-day, in such a way as the Institute shrank from doing.

To-day tenders will be received for a church (St. Michael and All Angels) possessing more than usual uniqueness of character, about to be built on the Bedford Park Estate, Turnham-green, Mr. R. Norman Shaw, R.A., being the architect. The design is certainly one of the most piquant we have seen for a long time and puts us in mind of that quaint mixture of Late Gothic and Renaissance, which is to be seen in a few towns and out-of-the-way places, erected in the time of the Jameses. The library of Lambeth Palace is of such a character, but the work of Mr. Shaw does not contain anything the most conscientious Gothickist could object to, though there is a quaintly hybrid feeling in the gable of west elevation, the pedimented caps to the buttresses, the large circular brick carved window and the curious bracketed porch. Essentially picturesque also is the cupola.

* Published in the *BUILDING NEWS*, May 10, 1878.

between nave and chancel, springing from a plain level-tiled roof, and the three clerestory windows treated as dormers, with a balcony over aisle roof. The aisle and chancel windows are four-light, square-headed, Gothic in detail, but the east window is a pleasing variation from Late Gothic. The plan sections show a nave and two wide aisles, a deep chancel organ chamber and vestry, the nave being divided into four bays by obtusely-pointed arches. The roof, with its elliptical ribs and radiating struts over aisles is quite original in its framing, and though we take exception to one or two points, the design is highly interesting. We note the sanctuary is to be hung with stamped leather, and the woodwork throughout painted sage-green. We shall shortly publish some drawings of the church.

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WATER SUPPLY AND SANITARY MATTERS.

CROYDON.—The rural sanitary authority of the Croydon Union have just commenced drainage works for the Mitcham, Merton, Morden, Wallington, and Beddington district, which will involve the construction of 36 miles of sewers. The land for the outfall works, which are situated at Bygrove Mead, partly in the parish of Mitcham, and partly in Wimbledon, has been purchased at a cost of £11,300, and the engineering and superintendence will bring the total outlay up to £200,000. Mr. Baldwin Latham is the engineer, and the contractors for the construction of the works are Messrs. B. Cooke and Co., Battersea.

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LEGAL INTELLIGENCE.

NONCOMPLETION OF CONTRACT.—At Bridlington County Court, last week, the case of *Pickering v. Armstrong and Newton* was heard before Mr. Bedwell, judge. It was a claim of £10 for non-completion of contract. Defendants had entered into an agreement to do the brickwork required in the erection of five new houses in Medina-avenue, Bridlington. They neglected to complete the work, and plaintiff had to get other workmen to do it. The charges put in were the actual amounts paid for such completion. For the defence a set off of extras was put in, and it was contended that the specifications had been altered by erasures and interlineations since they signed the contract. Verdict for plaintiff of £4 and costs.

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"It is suitable for Railway Stations, Mills, Weaving Sheds, &c., but is specially applicable to Conservatories, Plant Houses, and Orchard Houses, and we should be very much inclined to try the system. It is certainly worth looking to."—*The Builder*.

"And will, in our opinion, supersede any other similar system before the public."—*Building News*.

"It seems to meet the end in view more nearly than anything we have seen yet."—*The Field*.

"The patent has given high satisfaction to every one using it."—*The Christian Union*.

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CHIPS.

A new police station and lock-up is about to be built at Long Eaton for the Derbyshire magistrates, from the designs of Mr. J. Somes Story, county surveyor; eleven tenders have been sent in for the work.

The Baptist chapel at Ripley, Derbyshire, has been reopened after alteration, from the designs of Mr. R. Argile, jun., effected at a cost of £200. Mr. W. Clarke, of Ripley, was the builder, and Mr. W. Roe the decorator.

The Chesterfield rural sanitary authority having received the sanction of the Local Government Board for a loan of £25,000 for works of water supply for Coal Aston, Dronfield, Eckington, Holmesfield, Killamarsh, Unstone, and contributory places, have authorised their engineer, Mr. Firth, to commence operations as early as practicable.

A stained glass window has just been placed in the south aisle of St. Edmund's Church, Salisbury. The subject is "Our Lord Purging the Temple."

New schools have been built at Prittlewell for the Southend-on-Sea School Board. Mr. Scott was the contractor.

The Town Commissioners of Weston-super-Mare received on Thursday week the deed of conveyance of the Local Water Works Company. The sum to be paid by the ratepayers to the company for the transfer is £65,000.

A series of street tramways were opened at Newcastle-on-Tyne on Monday week. They have been constructed for the Corporation at a cost of £30,000.

An infectious diseases hospital has just been completed for the Eastbourne Board of Guardians, from the designs of their architect, Mr. G. A. Wallis.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

At a special meeting of the shareholders in the Dorking Water Company, the requisite sanction was given to an application to the Board of Trade, for a provisional order to enable the company to raise £10,000 additional capital to extend their works and obtain a new supply of water. The company's present supply only provides for about a third of the town, but it is proposed to obtain water by gravitation from the hills on the south-west of the town, and to furnish every house in Dorking with water.

Extensive improvements, carried out at a cost of £40,000, have just been completed at the London Bridge Terminus of the London, Brighton and South Coast Railway. The platforms have been lengthened into the "yard," the signalling apparatus has been concentrated into one improved house in the centre, in which are fixed 280 levers, the point arrangements have been remodelled, and the lamp-room has been removed from the end of the platforms to the arches beneath. Great difficulty has been encountered in making these changes, as not fewer than 500 trains pass in and out of the terminus every week-day, each of which has to cross over, not only from the down to the up sides, but also across at least one line of the second set of rails laid down both on the main and South London lines.

A fine arts loan exhibition was opened at Cheltenham yesterday.

A special meeting of Harwich Town Council was held a fortnight since, to consider the old and vexed question of sewerage, and, after a long discussion, it was decided by 10 votes to 2 that the scheme should be adopted. It was therefore decided to apply for permission to borrow £10,000 of the Public Works Loan Commissioners to carry out the same. Messrs. Russ and Minns, of Westminster, are the engineers.

The parish church of St. Peter, Matlack, Norfolk, was reopened on Sunday week, after restoration from the designs of Mr. Chapman, of Hanworth. The entire woodwork of the nave and aisles' roofs has been restored, but the lead has been removed and replaced by slates.

The contractor for the Auxiliary Water Works at Heanor, Mr. Horsfield, of Kimberley, has had his contract to sink at £9 per yard annulled. The works at the shaft, which is 120ft. deep, and has already cost about £500, are at a complete standstill owing to the influx of subsoil water.

Foundation and corner stones of new Primitive Methodist schools were laid in Sutherland-road, Gateshead, on Thursday week. The school will accommodate 400 children, and will cover an area of 41ft. 9in. by 34ft. 4in., besides vestries and heating chamber. Mr. Thomas Southern, of South Shields, is the architect, and Mr. Thomas H. Hutchinson, of Gateshead, is the builder. The cost has been £900.

Salem Chapel, Leeds, after being closed many weeks for extensive alterations, repainting, and decoration, was reopened on Monday. The work has been under the superintendence of Mr. Archibald Neill, architect, Cookridge-street, Leeds.

Eppe's Cocoa.—GRAVEYLAND COMFORTING.—"By a thorough knowledge of the natural laws which govern the operations of digestion and nutrition, and by a careful application of the fine properties of well-selected cocoa, Mr. Eppe has provided our breakfast tables with a delicately-flavoured beverage which may save us many heavy doctors' bills. It is by the judicious use of such articles of diet that a constitution may be gradually built up until strong enough to resist every tendency to disease. Hundreds of subtle maladies are floating around us ready to attack wherever there is a weak point. We may escape many a fatal shaft by keeping ourselves well fortified with pure blood and a properly nourished frame."—*Chief Service Gazette*.—Sold only in packets, labelled—"JAMES EPPE & CO., Homoeopathic Chemists, London."—[ADVT.]

WHITLAND ABBEY GREEN SLATES

These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

Trade News.

WAGES MOVEMENT.

BURNLEY.—The master joiners of Burnley have given their men notice that after February 1st their wages will be reduced from 7d. to 7d. per hour, and their working time lengthened from 52 to 54 hours per week.

LEEDS.—The master builders of Leeds have given notice of a reduction of wages. The masons' and joiners' wages are to be reduced 1d. per hour, and a proportionate reduction is to be made in the other branches of the trade.

WOLVERHAMPTON.—On Saturday week the whole of the associated builders in Wolverhampton gave their men notice of a reduction of 1d. per hour all round, to take effect from January 18.

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TENDERS.

CARDIFF.—For Bible Christians' chapel and minister's house, Cardiff. Messrs. Habershon and Fawcner, architects:—

	Chapel.	House.	Total.
Evans, S. ...	£1,789 0	0 £988 0	0 £2,787 0
Robbins, Jus. ...	1,750 0	0 900 0	0 2,650 0
Price and Evans ...	1,600 0	0 950 0	0 2,550 0
Morgan, J. Llantrissant ...	—	—	2,350 0
Marshall, H. ...	1,555 0	0 770 0	0 2,325 0
Purnell and Fry ...	1,498 0	0 727 10	0 2,225 10
Shepherd, C. ...	1,440 0	0 775 0	0 2,215 0
Thomas, Joh. ...	1,478 0	0 730 0	0 2,208 0
Knill and Green ...	1,470 0	0 729 0	0 2,199 0
Green and Millers ...	1,330 19	8 847 6	8 2,178 5
Shepton, S. ...	1,446 0	0 727 12	0 2,173 12
Gough, J. ...	—	—	2,170 9
Jones, D. C., and Co.,	—	—	—
Glaister ...	1,361 0	0 789 0	0 2,150 0
Lewis Bros. ...	1,429 0	0 700 0	0 2,129 0
Howard, E. ...	1,455 4	10 644 0	0 2,099 4

CARDIFF.—For Wesleyan chapel, Broadway, Cardiff. Messrs. Habershon and Fawcner, architects:—

Davies, D. J. and D. ...	£5,910 0
Cocks and Clarke ...	5,400 0
Robbins, Jns. ...	5,205 0
Webb, W. and J. ...	5,170 0
Shepton, S. ...	5,165 0
Fox, C. ...	5,150 0
Price, R. ...	5,134 0
Knill and Green ...	5,000 0
Miles, C., Newport ...	4,938 0
Biggs, Jacob ...	4,920 0
Linton, J., Newport ...	4,800 0
Jones, D. C., and Co. ...	4,760 0
Robbins, J. ...	4,500 0
Purnell and Fry ...	4,496 8
Thomas, Joh. ...	4,446 0
Shepherd, C. ...	4,339 0
Gough, J. (too late) ...	4,523 0

TOTTENHAM.—For the erection of a pair of semi-detached villas in the West Green-road. Mr. Spencer W. Grant, architect, 14, Duke-street, Adelphi, W.C.:—

Mattock Bros., Wood-green ...	£2,073 0
McCowan ...	1,762 0
Pocock ...	1,750 0
White, Stamford-hill ...	1,600 2
Noddins, Tottenham (accepted) ...	1,599 6

FOREST GATE.—For first portion of the Tonic Sol Fa College, Forest Gate, Essex. Mr. T. Lewis Banks, architect; quantities by Mr. J. Sargeant:—

	Two class rooms.	Tur. ret.	Piano-forte cells.	Total.	Allowance for sand and ballast.
Toms ...	£1,658	£620	£620	£2,898	£30 0 0
Josolyne ...	1,638	622	592	2,852	38 0 0
Bangs & Co. ...	1,628	605	563	2,796	31 0 0
Downs, W. ...	1,592	590	570	2,752	3s. 6d. per yard cube.
Sharp & Mills ...	1,470	606	566	2,636	44 0 0
Mortar ...	1,485	567	553	2,615	7 0 0
Hunt (too late) ...	1,421	542	435	2,398	28 10 0

* Accepted, except as regards allowance for sand and ballast.

GREENWICH.—For additions to the Boys' School for Roon's Charity Trustees, of a kitchen with class-room over:—

	Kitchen.	Kitchen and class-room.
Hatfield, H. ...	£476	£660
Jerrard, S. J. ...	469	657
Hammer ...	410	577
Woods and Wheeler ...	305	560
Bridel, H. ...	350	547

[* Accepted for both works.]

LINCOLN.—For the completion of works at the east end of St. Swithin's Church, Lincoln, comprising chancel, vestry, and organ chamber and iron enclosure fencing:—

Pattinson, S. and W., Ruskington ...	£3,012 19
Otter and Elsey, Lincoln ...	2,860 6
Thompson, G. M., Louth ...	2,800 0
Greenham, Branstion ...	2,689 0
Close, H. S. and W., Lincoln ...	2,653 13
Rudd and Son, Grantham ...	2,585 0
Cornish and Gaymer, Norwich ...	2,550 0
Walter and Hensman, Horncastle ...	2,545 0
Burton, S. B., Newcastle ...	2,395 11
Baines, Charles, Newark (accepted) ...	2,380 0

MARSHES-ROAD SCHOOLS.—Messrs. Habershon and Fawcner, of London and Newport, Monmouthshire, architects:—

Prosser ...	£2,090
Wehber, R. ...	2,049
Jones and Son ...	2,040
James and Sons, Bridgend ...	1,900
Stephens, Ellis, Abergavenny ...	1,900
Linton, J. ...	1,890
Richards, H. ...	1,877
Williams, ...	1,845
Sketch, H. B. ...	1,843
Miles, C. ...	1,839
Hazell, A. ...	1,825
Blackburn, W. ...	1,799
Davies, Bros. ...	1,798
Jones, D. C., and Co., Gloucester ...	1,787

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LONDON, FRIDAY, JANUARY 10, 1879.

ROYAL ACADEMY EXHIBITION OF WORKS BY THE OLD MASTERS.

THE old masters are just now represented in two of our leading art institutions with a completeness leaving nothing to be desired. At Burlington House an abundant feast was opened to the public last week; and the visitor—if he cares also to inspect the drawings and water-colours at the Grosvenor Gallery previously noticed by us—may obtain a very comprehensive view of the essential characteristics of the leading schools of painting, especially the Italian, German, Dutch, Flemish, and English. The works of the Caracci, Parmigiano, and Domenichino are numerous, but those giants of art, Raphael, Leonardo da Vinci, Michael Angelo, and Hans Holbein, are conspicuous at Burlington House. Portraiture takes up a large portion of the wall space, and we pass some excellent portraits in the first gallery by J. Hopper, R.A., Sir Thomas Lawrence, Sir Joshua Reynolds, George Romney, Hogarth, and Gainsborough. The portrait of Charles James Fox by Sir Joshua Reynolds (17), lent by the Earl of Leicester, is an exceedingly fine painting, possessing the freedom, vigour of handling, and colour of that illustrious master. It is half-length, showing the great statesman with a paper on a table entitled, "A Bill for the better Regulating the Affairs of the East India Company," upon which the Coalition Ministry was defeated in 1783. Fox had asked the painter to show the bill, and his finger pointing to it; and in Leslie and Taylor's "Life of Reynolds" there is a correspondence between Fox and the artist as to the representation of the document, in which Fox felt a just pride. Lady Hamilton as "Euphrosyne" (35) is a bright face, with smiling eyes, painted in vignette style by George Romney. T. Gainsborough's "Pink Boy" is a full-length standing figure of a boy in a red fancy costume, holding a red hat with feather. There is a graceful elegance in the figure, which is vigorously painted. The same artist's full-length portrait of Mrs. Lee Acton shows a pleasing-looking girl-like face, the figure dressed in white. Among other portraits are Sir Joshua Reynolds' "Kitty Reynolds" (48); William, second Duke of Leinster (44); Miss Pelham, daughter of Right Hon. H. Pelham, an excellent rendering of a pallid complexion in a black dress; W. Hogarth's portrait of Dr. Arnold, excellent in the colour and bluff countenance; and a few admirable portrait-pictures by Johann Zoffany, No. 27, "A Musical Party on the Thames," being particularly interesting as a group in which a family likeness is evident. Gainsborough's portrait of "Girl in a Straw Hat" is an admirable study of good features and a listless mood of countenance. A few excellent landscape and subject pieces meet us. We note especially Geo. Morland's "Cherry Seller" (6), transparently coloured; Henry Fuseli's "Nightmare" (15), a half-draped female with head dropping, and some hideous spectres above her; W. Van de Velde's charming picture entitled "A Calm" (18); a "Coast Scene," by Jan Van de Capelle; "Sunrise on the Coast," by William Collins (40), a pleasing bit of beach scenery, especially in the sea; David Teniers' "Brick-makers." That inimitable Dutch painter, Jan Steen, is represented by a few characteristic pieces, such as "Boors Quarrelling" (57), "Saying Grace" (54), "A Dutch Festival" (99), "Musician" (86). In these we observe that minuteness of detail, animation and spirit, and fresh colouring so peculiar

to his works. "Church of San Salute, Venice" (61), "View of Venice" (69), "Interior of St. Mark's, Venice" (238), "Giants' Staircase" (236), and some few more are charming views of architectural subjects, painted with that accuracy of detail and freshness and transparency of colour which so delight us in all Canaletto's works. The "Giants' Staircase," showing the courtyard of the Doge's palace, is a masterpiece of architectural detail and execution, while his views of the canal are too well known to need comment.

"Landscape and Birds," by Melchior de Hondcoeter (65), is a fine picture (the canvas being 61 x 79 in.) of a group in which a jackdaw, with a peacock's feather, is being vanquished by a game cock. The plumage is a masterpiece of imitative painting. The "Seven Acts of Mercy," by D. Teniers, is another painstaking work, executed with much detail, and chiefly clever is the grouping. The same great Flemish master is represented in several other pieces. We may name "Landscape, with the Château of the Painter" (75), "An Alehouse Interior," "Village Surgeon," as exhibiting the qualities of animation and grouping by which this realistic painter is best known. We are not sure, however, to which we must attribute these works—the elder or younger Teniers. "Ruth and Boaz" is a fine composition by Gerbrandt van den Eeckhout, in which Boaz is blessing Ruth, who is upon her knees. The yellow drapery and colour are admirable. We also note a "View in Amsterdam," by G. B. Heyse (painted 1685), a clever architectural piece; and an "Interior of a Church" (89), by Emmanuel de Witte. That master of still-life subjects, Francis Snyders, in a piece under that title (98) is represented in some finely-painted poultry, fish, and fruit—rather more to the taste of the gourmand in its coarse mixture. The lover of animal food will also find two magnificent pieces by the same master of fish of various kind, grouped in profusion on a bench (244, 227). Those who admire sea pieces will enjoy that of William Van de Velde (95) as a calm and pleasing example of that master; also No. 103. Tenderly painted is "L'Hôtellerie" (100). One of the finest subjects, upon a canvas over 7 ft. square, is entitled "Rinaldo and Armida" (126), from Tasso's "Jerusalem Delivered," canto XVI. Asleep under a tree, Rinaldo is about to be entangled in a wreath by Armida, attended by Cupids, and clad in flowing drapery. Painted by Sir Anthony Vandyck, this subject, exhibits all the powers of that great master of allegory and portraiture, and the grace of the figures and rich colouring are very fine and impressive. We must note, near, a sketch by Rubens for one of the paintings in Whitehall Chapel (130); the figures, brilliantly coloured and foreshortened, are seen from below. Other sketches by the same painter are classically conceived pieces from the Homeric story, in which Achilles is the chief figure. The panels are small, but are admirable as examples of decorative value (152, 153, 154, 159, 160, 161). These splendid sketches are lent by A. H. Smith Barry, Esq. Another grand conception is "The Assumption" (132), by Bartolomeo E. Murillo, a full-length figure of the Virgin floating in clouds and supported by angels. We have only space to allude to a great work, "Falls of Schaffhausen," by J. M. W. Turner (169); portraits of Sir Joshua Reynolds, J. Bacon, and Sir W. Chambers, by J. Zoffany (172), admirably painted; and to some most interesting paintings of the Early Florentine, Giotto, Da Vinci, Tuscan, Byzantine, and other schools, in Gallery IV. A very finely illuminated vellum of the "Descent of the Holy Spirit" and the "Decease and Glorification of the Virgin" (176, 177); a Virgin and Child, by S. Botticelli; a fine Diptych, by Taddeo Gaddi, of the 14th century; and that of the

"Virgin and Child, and St. John;" a fresco of St. Francis; a richly painted and grouped figure of "Virgin and Child;" (201); "Virgin Child and Saints," by Giovanni Bellini (203); also 205—must be particularised as examples of the earlier conventional paintings of sacred subjects. In some of these the expression and features are benignant and softly rendered; in others the countenances are by no means angelic.

Entering Gallery VII. we come to an interesting collection of cases of miniatures, lent by the Duke of Buccleuch, J. Whitehead, Esq., E. Joseph, Esq., the Queen, &c.; but we pass by them to notice a collection of drawings by the old masters, which for beauty and variety of composition and execution cannot be surpassed; and here the number of works prevent us giving more than a very inadequate notion of the most important and characteristic sketches. We select for notice more particularly the studies and sketches of Raphael, Leonardo da Vinci, Michael Angelo, Hans Holbein, Rubens, and Albert Dürer, in galleries Nos. VIII., IX., X. Those of Raphael have been largely contributed by the University of Oxford, the Duke of Devonshire, and the Queen. No. 109, a first sketch of Adam and Eve expelled from Paradise, is an exceedingly simple and expressive sketch in black chalk. The heads of Homer, Virgil, and Dante, in the fresco of Parnassus in the Vatican (113), is a mine of study in composition; it is in pen and ink. There is a grand instance of foreshortened limbs in "Group of Warriors," in black chalk (115), by Michael Angelo. Raphael's study of cartoon of "Elymas Struck Blind" (118), in pen and bistre, gives a faint idea of the artist's power for classical composition; but that master's group of "Figures Fighting" (124), and "Massacre of Innocents" (127), are, perhaps, unsurpassed for the life, animated expression, and spirited movement capable of being imparted to sketches. In grandeur of conception or grouping nothing can surpass No. 137—"Transfiguration," a study for the picture in the Vatican; "Virgin and Child" (141), a study for "La Madonna dell' Impannata," in the Pitti Gallery; study for the "Charge to Peter" (147). Most of these are drawn in red chalk or in pen and bistre, and are studies for frescoes, cartoons, and pictures, some of which are in the South Kensington Museum, others in the Vatican and Louvre. The studies include many that may be classed under the three styles followed by Raphael, verging from the religious feeling exhibited when under the influence of his master, Perugino, to the sublimer feeling under the Renaissance. When we pass to the studies of Da Vinci we cannot fail to notice the versatility of that great master of the Renaissance. The sketches have been lent chiefly by the Queen from a volume of the artist's drawings in Windsor Castle. We observe among them some remarkable studies of heads in pen and bistre, also machines, designs for castings, studies of horses' heads and limbs (169—180). The last of these shows a number of angular lines and proportions of the fore legs of a horse with notes in the painter's own hand. One of the most important contributions is No. 190, the "Holy Family," lent by the Society of Arts. It shows the Virgin, St. Anne, with the infant Jesus, and St. John, drawn to a considerable size in black chalk heightened with white. Vasari speaks of this very cartoon, executed at Florence, as a marvel which astonished "men and women, young and old, who came to see it when finished." The Virgin's face is extremely benignant and tender. We may remark also a series of studies of heads, shoulders, muscles of leg and foot, skulls, and other anatomical demonstrations, with notes in Da Vinci's own hand. Gallery No. IX. is filled with portraits by Holbein,

executed in the usual outline manner of that great artist. Many are drawn in black chalk or pen and ink on a tinted red paper, and have been contributed by the Queen. They represent heads, often in pairs, of the great men and ladies of his time. Thus, 224 is an outline of two heads, one inscribed "Tho. Wiatt, Knight," the other "S. Tho. Wiatt, K.; portrait of the favourite of Henry VIII., poet, savant, and statesman." Dated 1533. Full-length figures of Henry VII. and Henry VIII. (231) is a cartoon for a part of the destroyed fresco at Whitehall, painted in 1537. The entire composition is preserved at Hampton Court. This is a fine drawing in chalk, in which the figures and architectural accessories are effectively shown. So also is a half-length figure of "Jane Seymour, Queen," 245. We have little space left to speak of other masterpieces, but those of Michael Angelo cannot be passed over. Mentioning a few, we may point to No. 249—"A Study of Proportion of the Human Figure," in red chalk, with notes in the artist's own hand; 252, a study for the fresco of "Isaiah," in the Sistine Chapel, in bistre; a "Grisaille of the Cartoon of Pisa," in oil (255); a copy of portion of "Last Judgment," in Sistine Chapel (258)—a model of study worth close examination; "Three of the Labours of Hercules" (269), a spirited sketch of muscular movement; No. 302 equally striking as expressive of animation and movement of figures. In Gallery X. a few excellent studies by John Flaxman, R.A., are to be seen. "Visit the Sick" (359 and 365) are feelingly-conceived outlines, and exhibit many of the higher qualities of grouping and expression of that artist. We note other drawings by James Barry, R.A., Thomas Gainsborough, R.A., and several excellent studies by Claude and Rubens. The "Fall of the Damned" (436), in black and red chalk, is a grand conception of entangled human beings, with a fine warmth of tone; No. 440 is another vigorous sketch in water colours, heightened with white, but we cannot point to others of equal interest and value to the student of art. We consider the collection of chalk and bistre studies alone a school of immense value to the artist of figure and the decorative designer, and it is much to be wished that such an exhibition could be permanently maintained by Government or added to one of the national collections.

HOUSE DRAINAGE.

WE are glad to see at last that the doctors—although as yet only some few—are beginning to teach publicly that defects in house drainage are the cause of a great deal of the illness of the people of this country; and, inasmuch as a constructor is better than a repairer—a maker better than a mender—inasmuch, in short, as that prevention is better than cure—those medical men who have turned their attention to the means of preventing illness from poisonous air, food, and drink are likely to have a better time of it in the future than those who do no more than cure illness—great withal as is that act, undoubtedly.

Mr. Teale, an eminent surgeon of Leeds, has pointed out,* in fifty-five illustrations, the defects commonly met with in houses. Many of these have come under his own observation, others have been stated to him by medical friends, and others again by an architect and by a plumber, both of Leeds. The author considered—and we agree with him—that there was need of a book, the aim of which should be "to teach in as simple, telling, and unmistakable a way

as possible the faults of sanitary construction which it is within the power of landlord and tenant, as distinct from the public authorities, to remedy and avoid;" and accordingly his design has been to represent pictorially every important fault to which domestic sanitary arrangements are liable, or (in the words suggested to him by a medical friend) to produce "a clinical history of the defects to which drains are liable," and to point out the consequences of such defects by instances of the illness produced thereby. Mr. Teale does not profess to offer opinions how the various defects ought to be rectified, although he does, in a considerable number of instances, offer some good practical remarks thereon. To this apparent want of completeness he has two answers: firstly, that when we have discovered what is wrong we are more than half way to what is right; and, secondly, that in pointing out what is wrong he deals with unquestionable facts, while if he were to advise what ought to be done he would be in danger of going beyond his depth—of trenching upon the province of experts, officers of health, and sanitary engineers; and would be "touching on matters concerning which there may be various solutions, various opinions, and changes in course of time." This diffidence is to be regretted, as will be well understood by those who have, under the present state of circumstances, to devise proper sanitary constructions, or to remedy defects of those existing.

The subject is illustrated by fifty-five plates, with letterpress description of each. Although they are not drawn with any exactitude of scale or proportion, they very graphically show what is intended to be represented—as, for instance, the discharge-pipe from a lavatory, untrapped, and entering directly into a drain, or into the soil-pipe of a w.c.

Also, in the same way, the discharge pipe from a scullery sink, a kitchen sink, a housemaid's sink, a pantry sink, a dairy sink, a "save-all" tray in a water-closet, the dish-stone in the floor of a keeping cellar (or of any cellar or scullery), and the discharge pipe from a bath: also, in the same way, the overflow or waste pipe from a bath, lavatory basin, or water cistern. Plate 4 represents one of these discharge pipes from a kitchen sink entering directly into a drain without being trapped.

In one case stated (Pl. 10) the discharge-pipe of a lavatory basin is, indeed, trapped with the usual S bend; but this was rendered useless by the overflow pipe being connected with the discharge pipe below the trap, and therefore communicating directly with the house drain, and serving as a ready inlet of drain air into the house. This occurred in a house sold to a surgeon in Leeds as having been recently fitted up with all sanitary convenience and precaution.

Another instance of the effect of the escape of air from drains is described as follows (Pl. 28):—"In the dairy and larders of the new Leeds Infirmary there were found sink-stones practically untrapped in every instance. It is probable that this communication with the drains may have been the explanation of certain outbreaks of diarrhoea in the hospital, which were attributed to the milk, but without any such source of its contamination being suspected."

Where there are two or more water-closets, one over another, all discharging into the same vertical soil-pipe, the siphon bends being adjacent thereto, the water in the lower siphons is liable to displacement by the passage down the soil-pipe of water from an upper closet. The action takes place in this way:—When water is discharged from the upper closet, each siphon bend below it being filled with water and at

rest, performing its office of preventing the passage of air from the soil-pipe inwards, its rush down the pipe displaces a quantity of air equal to its own bulk, and rarefies the air immediately behind it; then, the air in the closet being under the full atmospheric pressure, drives the water before it out of the trap into the soil-pipe, and "unsiphons" the trap. This unsiphoning is more or less complete as the soil-pipe is smaller or larger in diameter. When it is small, the discharge of a gallon or two of water into it fills it, the water acting like a quickly-moving piston, and the air which follows it becomes highly rarefied, and in that case the emptying of the siphon bend is complete, by reason of the atmospheric pressure above mentioned; but if the soil-pipe be larger, so that the ordinary discharge of one or two gallons of water will not fill it, or nearly fill it, the air surrounding the water in its descent will be less rarefied, and the unsiphoning will be less complete, while with a sufficiently large pipe the action would not take place at all.

A soil-pipe should not be less than four inches diameter for one closet, or six inches for three, one above another; and in both cases should be carried up of the full size to, and above, the eaves of the roof; but not, of course, immediately below a window in a roof. Plate 14 is an attempt to show in a diagram the action of water and air above described.

Plate 7 shows how to correct the fault of the discharge pipe from a kitchen sink entering directly into a drain—first by trapping the pipe with an S bend; and secondly by making it discharge into (not above) a trap outside the house wall, having over it a grated opening, and the discharge pipe entering the trap above the water level.

In Plates 18 and 19 the defects of lead soil-pipes are shown. In a house recently occupied by a relative of the author, an old water-closet was removed, and the lead soil-pipe was found to be so rotten that "it crumbled like short-cake. It was open at the seam, so that not only gas, but liquid sewage had escaped." The eating away of lead pipes by sewage gases has been found mostly to have taken place in pipes which have been unventilated. The author points out the danger of leaving lavatories and water-closets long disused, because the water in the traps soon evaporates.

In Plate 22 is shown a common defect—or, rather, two defects, one of which is not remarked upon by the author. The one remarked upon is the termination of a ventilating pipe immediately below a window. The other defect shown in the drawing is the smallness of the ventilating pipe carried up from the upper bend of the soil-pipe.

By dint of persistent iteration, builders and plumbers have come to see that the soil-pipe of a water-closet must be ventilated; but as there never has been—and even is not yet—any command that the ventilating pipe shall allow sufficient room for the air in a soil-pipe to escape through it freely when a body of water is discharged into the soil-pipe, the plumbers have attached pipes (like this one in the drawing) altogether too small in diameter to allow the air to escape by that outlet—its passage through so small a pipe being much more difficult than through the basin into the closet, alongside of, and partly through, the water which passes out of the basin.

The ventilating pipe should in all cases be of the full size of the soil-pipe itself. There is yet in this drawing a third defect, which is that the end of the ventilating-pipe is turned downwards. It occurs in Plates 2 and 16, as well as in No. 22. Why turn the outlet downwards? There is no need to prevent rain falling into it—indeed, that is beneficial. Birds do not build their

* Dangers to Health: A Pictorial Guide to Sanitary Defects. By T. PRINGLE TEALE, M.A., Surgeon to the General Infirmary at Leeds. London: J. and J. Churchill. Leeds: Charles Goodall.

nests upon the open end, although that was once prognosticated. On the other hand, the abrupt bend offers great resistance to the passage of air out of the mouth of the pipe.

Plate 45 illustrates a case which is headed, "Poisoned by next-door neighbour's drains." The case was supplied to the author by Mr. Hewetson, surgeon, of Leeds, who having corrected every fault he could find in his house, it yet continued to be unhealthy, and did not lose the smell of drains until his next-door neighbour had his own drains inspected, when it was found that the soil-pipe passed beneath a set of stone steps common to the two houses, and that it had several openings in it. Another illustration shows the ravages which rats make when, through openings carelessly left in drains where one pipe joins another, they escape from the drain into the house. Other plates show, "How people drink sewage." Another, again, illustrates what a leading builder of Leeds stated to the author—that it was well known in the trade that speculating builders of cheap houses were in the habit of buying "seconds" drain-pipes at half-price (pipes which are broken, mis-shapen, and rejected).

On the use of road-scrappings and common house ashes, ground up with a bare pretence of lime, for mortar, and plaster for the walls of "miserable tenements," the author says: "In about sixty new speculators' houses not a single load of clean lime was used; mortar and plaster were made of lime which had been used in tan-pits, therefore spent and full of animal cleasings. The owners were the builders of the houses."

Plate 43 shows a case which touches a wide question. It has always been a difficulty with corporations and local boards—and latterly with all sanitary authorities—to secure proper superintendence of the laying of house drains. In this case a house was built at Halifax on "solid rock," in which the cellarage was excavated. This experience of its solidity seems to have suggested to the builder that it might be well, indeed, to lay the drain, as far as the cellarage extended, from one side of the house to the other; and also to lay, from the junction with the sewer (at a distance of about twelve yards off), one or two pipes (of course, as the author says, the authorities saw the junction made with the sewer), and in that state he left the work, with twelve yards of rock between the two portions of the drain which he had laid. It would appear, however, that this "solid rock" must have been a good deal fissured, for into the portion of the drain which lay under the cellar floor all the sewage of the house (including a w.c.) was discharged for seven years—that is to say, ever since it had been built—until, the children in the house being always ailing, the occupier took up the cellar floor, and found there a very large quantity of sewage, and found also the abrupt termination of the drain against the rock. Plate 47 shows a case which touches the same question. It is headed, "Economy in digging at the expense of fall in a drain." A sewer is laid at the proper depth to allow a sufficient fall for the house drains; but instead of giving the drain the proper fall, the builder gives it but little from the back of the house to within a few feet of the sewer, and then goes down precipitately to the junction.

In Plate 49 we are reminded of the necessity of a plan of the drains. Two or three men are searching for a drain under a house floor—"Hunting for drains;" but as there is no plan of the drains, there is no certainty where they will find any of them.

That houses should not be built upon the refuse from other houses, filled into old clay pits, and other hollows into which

rubbish may be shot, is pretty well known to our readers. This is what Mr. Teale says on the subject:—"Until recently no check has been put upon the haste of speculating builders, who have built thousands of houses on unhealthy rubbish-heaps, long before the animal and vegetable refuse has had time to ferment, decompose, and cease to be poisonous." These are the words of a medical man.

How to admit fresh air into houses is a question upon which the author offers remarks with some diffidence; but describes a method which he has adopted in a house of his own, the effect of which, he says, is that "the rooms are constantly fresh night and day, irregular draughts are much reduced, and, except in cold weather (an outside temperature approaching 32°) the ventilators are rarely closed." This is illustrated in Plate 53, and in No. 54 is shown another method of accomplishing the same object.

We recommend this book most highly. It shows, as the author says, work defective from ignorance and work defective from dishonesty. "Probably," he says—and it is quite true—"no work done throughout the kingdom is so badly done as work in houses, drains, and pipes, which is out of sight."

SCHOOLS OF ART.

DUNDEE.—At the eleventh annual festival of the Dundee School of Art the annual report which was read stated that the school had been successful in obtaining from the Government Science and Art Department, South Kensington, London, the following medals, certificates, and prizes, &c. :—In the second-grade examination, the subjects being practical geometry, lineal perspective, freehand, and model drawing, 112 students passed, and 46 obtained prizes; 2 students obtained third (highest) grade prizes for passing all the second-grade subjects in one year; 19 students obtained full certificates of the second grade, one of these being a drawing teacher's certificate of the second grade. In the third (highest) grade examination 8 students passed in third (highest) grade perspective; 4 of these obtained the mark good from the examiner; 2 students passed in third (highest) grade artistic anatomy; 17 students' works were considered satisfactory by the Department's examiners—10 of these in the advanced stages of art; 14 students obtained third (highest) grade prizes for drawing and painting from the east and nature, &c. In the science examinations the students of the school were very successful. In plane and solid geometry 1 student obtained a first-class certificate in honours, 3 second-class certificates in honours, 18 Queen's prizes, 6 second-class certificates. Thirteen prizes were obtained in machine construction and drawing, and 37 second-class certificates. In building construction 9 Queen's prizes and 26 second-class certificates were obtained. Three students gained national Queen's prizes, 1 a national bronze medal, 1 a national silver medal and 1 an art master's certificate. Two assistants had been successful in getting appointments as head-masters of schools of art during the year.

TAUNTON.—On Monday the prizes and certificates awarded to students were distributed by Sir Henry Cole, K.C.B. The treasurer's report complains of the continued falling off of receipts; the honorary subscriptions had diminished, and the school fees, which last year reached £180 in 1878, only amounted to £157. Mr. Rowe, the head-master, in his report stated that there were four more students than last year, and that the diminution in fees resulted from the increased proportion of evening students, and also from the irregularity of attendance of industrial students affecting the Government returns. For the 487 works sent up by 87 students for inspection 4 third-grade prizes of hooks were awarded. The local examinations in May were attended by 32 students, of whom 12 were successful, and 5 obtained full certificates as having passed in four second-grade subjects. Of outside candidates 33 presented themselves, and 3 were successful.

THE FEMALE SCHOOL OF ART.—The annual exhibition of the prize works of the students at the school is open in Queen's-square. The result of the past year shows that eight first-rank prizes were taken in the national competition by the Queen's-square students—the national gold medal, for a chalk drawing from the antique "Fighting Gladiator," by Mary Katherine Benson; the national silver medal, for a drawing from the same figure, by Ida Rose Lovering; a national bronze medal to Alice Hanslip for a drawing of the Laocoon, and another to Maud Ashley West. Four other national "Queen's prizes" were won by Ida R. Lovering, Ellen Ashwell, Edith Gibson, and Florence Reason. The gold medal given by the Queen was awarded to Anne Elizabeth Hopkinson for an oil painting of a group of fruit, with a silver cup and other objects. Important encouragement is afforded by the scholarships gained by the school. Of these, the Queen's Scholarship of £30 for one or two years has been taken by Elizabeth Mary Lovell; the National Gilchrist, of £50 per annum, for two years, by Charlotte Maud Havell and Harriett Ada Payne; while subscribers' scholarships of £20 and £10 are awarded to Catherine M. Wood and Florence Reason. The school has, besides the first rank places already mentioned, obtained no less than 38 of the third-grade prizes awarded. The Department of Science and Art have further signified their approval of the work of the school by purchasing the drawing of the "Gladiator," by Miss Benson, and the study from the life of two mice nibbling at cheese, by Miss Ashley West. The Queen also gave an additional mark of her interest in the success of the gold medallist, Miss Hopkinson, by purchasing two water-colour studies of flowers by her. The Royal Academy, after having examined the drawings from the antique by them, have admitted the following students to the schools:—Alice Hanslip, Ida Lovering, Mary Katherine Benson, Susan Ruth Canton, Frances Binns, Louisa Jacobs, Margaret Dicksee, and Alice Sarah Miller.

Plans are being prepared by Mr. Drew for the alteration and extension of the sewage farm of New Swindon for that local board of the town.

The Marquis of Northampton has presented to the museum of Northampton a collection of geological specimens, which has been classified and arranged by Messrs. Etheridge and Newion. The collection occupies twelve table cases, nine of which are filled with exclusively British, and the remaining three with foreign specimens, and it is regarded by geologists as scarcely equalled for completeness in the kingdom.

St. John's Church, Pembroke Dock, is being restored, and a heating apparatus added. The work is being carried out by Messrs. Jones and John, Government contractors.

Mr. Henry Roe, the rector of Christ Church Cathedral, Dublin, in reply to an address signed by over 120 persons of eminence, clerical and lay, asking him for an expression of opinion as to the removal of the screen in the chancel, to which a few Irish Churchmen object, has given as his answer that he differs in every respect from those who address him.

A costly brass lectern, valued at upwards of £100, has been presented to the parish church of St. Oswald, Oswestry. Messrs. Jones and Willis were the makers.

Earl Granville who presented the prizes to the successful students at the Hauley School of Art last week, referred to the distress existing in the country at the present time, and said he did not think any exceptional measures were required to relieve it. They must in the future look to the improvement of technical education, for without knowledge it would be as impossible for us to compete with others as it would be for a savage armed with bows and arrows to contend against a man who possessed arms of precision.

It is stated that a large plot of land in Myatt's-fields, between Camberwell and East Brixton—a district now being rapidly covered with houses—has been reserved for conversion into a public park and recreation ground, and that it will be forthwith laid out in an ornamental design.

An extensive fissure has occurred in the keep of the new military brigade depot, near Devizes, and precautions have been taken to prevent an accident resulting. The keep is over 120ft. high, and, together with the other buildings, was only completed about nine months since at a cost of £45,000. The tanks at the top have a capacity of 5,000 gallons, but have not yet been filled. The failure is attributed to frost.

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S. RAPHAEL'S HOUSE OF CHARITY, BRISTOL—
ALEXANDRA MANSIONS, VICTORIA-STREET—"BUILDING
NEWS" CLUB DESIGNS FOR VILLAGE CLUB HOUSE.

OUR LITHOGRAPHIC ILLUSTRATIONS.

PUBLIC FOUNTAIN AT CHIPPENHAM.

THE design which we illustrate is by Mr. W. Galsworthy Davie, architect, and was selected from among numerous others submitted in competition last year. It is now being erected, but the detail shown in the view is not being strictly adhered to. The bulk of the masonry is in red and grey granite, polished in parts, Portland stone being used for the carved caps and upper part of middle bowl, the panel of same being filled in with polished granite. The drinking trough for cattle is to be paved with glazed tiles, and the whole will rest on one solid bed of concrete. The work is being carried out by Messrs. J. Easton and Son, of Exeter.

SAINT RAPHAEL'S NEW HOUSE OF CHARITY, BRISTOL.

THIS building is now in course of erection from the design of Mr. Edward Henry Edwards, architect, of Bristol. It will be a large and substantial structure, harmonising well with St. Raphael's Church and Almshouses. The principal front, including the projecting bay of chapel, is 106ft. in length, and the north and south fronts measure 50ft. The basement comprises refectory and mission-room, with kitchens, &c. The ground floor—chapel, community room, visitors' room, parlour, hall (with groined vestibule), sacristy, dispensary, portress, and room of the "Mother Superior." The staircase will be of stone. On the first, second, and third floors are bedrooms and dormitories, with an infirmary (for the use of the inmates), with ante-room, &c. The walls are built of Pennant stone, with freestone dressings, the external chimney breasts and shafts being of brick. The cost of carrying out the design, exclusive of chapel fittings, will be £7,320. Mr. E. C. Howell, of Bristol, is the contractor, and Mr. Edward Honey the clerk of works.

PIANOFORTE.

AMONG the specimens of English furniture shown at the Paris Exhibition, Messrs. Henry Ogden and Son, of Deansgate, Manchester, exhibited an inlaid satinwood pianoforte. The instrument, which we illustrate, is designed and worked out in the Adams style, the decorations being all inlaid woods beautifully shaded, and afterwards further relieved by the graving tool. The ordinary heavy look of a grand piano case has been avoided by introducing panels all round the sides and end, divided by framing and pilasters in mahogany. The more important panels are inlaid with appropriate figure subjects and trophies of musical instruments. The legs are square-tapered, with sunk inlaid panels on the sides, having carved and gilded capitals, and terminating with castors. The reduction necessary for our photo-lithograph renders the description of the details on the plate itself partially inaccurate. They are really shown about one-fifth, not one-third their real size.

A VILLAGE CLUB-HOUSE.

THIS design, by "S." in circle, is the one we awarded second in our Designing Club Competition, the first place being given to the design by "Triangle" in a circle, whose plans we published in the BUILDING NEWS for Dec. 27 last. The two designs ran each other very close, and we had some difficulty in determining which was the better of the two, but our detailed notes on these and the other designs of the same series will be found in our issue for Nov. 29 last.

TOMB OF EDWARD THE BLACK PRINCE, CANTERBURY.

EDWARD the Black Prince's Tomb, of which we give an illustration, is situated in Trinity Chapel, Canterbury Cathedral. This tomb was erected according to the prince's will, and is the most authentic memorial of the first of a long line of English heroes, and a fine specimen of the architecture of the period. The prince died on Trinity Sunday, June 8th, 1376; he had previously founded a chantry in the crypt, on the occasion of his marriage with the Fair Maid of Kent, 1363, in which he desired in his will to be buried; but for some reason this was not done. The effigy is in brass, and was once entirely gilt, and shows distinctly the Plantagenet features—viz., the flat cheeks and well-chiselled nose, resembling those of his father and grandfather at Westminster Abbey and Gloucester. Above are suspended his brass gauntlets, "the heaume du leopard," his casque, lined with leather, his shield of wood, covered with moulded leather, his velvet surcoat, with the arms of France and England, and the scabbard of his sword. The sword is said to have been taken away by Cromwell. Round the tomb are escutcheons of arms, charged alternately with the bearings of France and England quartered, the shield by which the prince had distinguished himself in the battle-field, with the ostrich feathers, and the motto, "Houmont Ich diene." Above is an inscription, said to have been composed by the prince himself:—

Tu q' passez ove touche close, par la ou cest corps repose
Entent ce q' te diray, sicome te dire la say.
Tiel come te es, je autiel fu, tu seras tiel come je su.
De la mort ne sensay je mie, tant come j' avoy la vie.
En terre avoy grand richesse, dont je y fya grand noblesse.
Terre, mecons, et grand tresor, draps, chivalx, argent, et or
Mes ore su je povres et cheitifs, perfond en la terre gys.
Ma grand beaute est tont alee, ma char est tonte gastee.
Mont est estroite ma meson, en moy na si verite non
Et si ore me veissez, je na guide pas q' vous decidez
Qu' j' eusse onges pour este, si su je ore de tont changee.
Par dieu pries au celestien Roy, q' mercy ait de l'arme de moy.
Tentel q' par moi prier ont, on a Dien m'acorderont,
Dieu les mette en son paraye, on nul ne poet estre cheitifs.

There is a representation painted on the canopy of the Holy Trinity, which he revered with peculiar devotion; there are also hooks for the hangings bequeathed in his will, black with red borders, with "cygnes avec têtes de dames."—F. W. RICHARDSON.

ALEXANDRA MANSIONS, VICTORIA STREET.

THIS building, when finished, is intended for residential purposes, each floor containing four residences or flats. The accommodation in each is varied, and in addition to the stone staircases shown on the plans, lifts—tenants' and servants' ditto—will be provided for the service of all floors. The design partakes somewhat of the French Domestic Gothic style, the whole of the exterior being of stone from the quarries of Mr. John Alford, of Tisbury, Wilts, all well worked and fixed by Mr. W. Slack, of Croydon; Mr. D. T. Haylock was the clerk of works. The buildings generally are similar in intention and design to the "Members' Buildings," situate in Victoria-street, and designed by the same architect, Mr. Francis Butler. Illustrations of this latter erection, and descriptions in greater detail will shortly appear in the BUILDING NEWS.

COMPETITIONS.

LAMBETH INDUSTRIAL PAUPER SCHOOLS.—At a meeting of the guardians of Lambeth Union, held on Wednesday week, a report was received from Mr. Currie, to whom had been referred the plans sent in in competition for the reconstruction of the pauper schools at Lower Norwood. He recommended that they be placed in the following order of merit:—"Light and Air," estimated cost, £20,070; "Terra Cotta," ditto, £33,700; "A Katepayer," ditto, £25,101 18s. 9d. On opening the sealed envelopes it was found that the first premium (£150) would, if Mr. Currie's recommendation were adopted, fall to Messrs. Coe and Robinson, 4, Fumival's-inn; the second (£100) to Messrs. F. H. Fowler and Aldwinckle; and the third (£50) to Mr. Edward Clarke, 6, Adam-street, Adelphi. The further consideration of the plans was referred to a special committee.

MARSHES-ROAD BOARD SCHOOLS, NEWPORT.—A letter has been forwarded to the School Board for Newport, Monmouthshire, and also to the local press, by Mr. Geo. H. Davies, one of the competitors for the schools in Maraes-road (the tenders for erecting which appeared in our last issue). He states that designs for these schools were invited and received from architects of Newport before January 18, 1878, and adds:—"The plans having been sent in in due course I was some time after greatly surprised to learn that a gentleman, having had the advantage of studying their details, was allowed to introduce an entirely fresh design, and that this, after various modifications, was to be finally accepted, although complying in no essential respect with the board's previous instructions. That there was in this a clear moral and legal breach of faith cannot be seriously denied. The absence of the courtesy usually extended to architects in similar competitions has also been remarkable—the receipt of the plans was not in any way acknowledged, the architects have not been informed of the result, thanked for their time and money uselessly expended, their plans not sent back, nor have they been told to fetch them away. On removing my own I find them seriously injured by dirt, &c." Mr. Davies says that the matter is now, so far as he is concerned, a closed and unfortunate transaction, and that as time has moderated his feelings he does not intend to renew ill-will by taking legal proceedings.

Invitations have been sent out from the architect's department of the Corporation of London to firms eminent in the art of designing public gardens to send in designs for the embellishment of the grounds to be formed out of the churchyard of St. Paul's Cathedral. The work, which is to be extended to three sides of the cathedral, will probably include improvements of an extensive nature, as well as some alterations to the outer railings. The scheme in its full details has not, however, according to the City Press yet been finally decided upon.

The thirty-first annual ball in aid of the Builders' Benevolent Institution will take place at Willis's Rooms, on Thursday, January 30.

The clock, bells, and carillon machine, supplied for the new Manchester Town Hall by Messrs. Gillett and Bland, of Croydon, were started last week.

A new tragedy about to be published by Messrs. Longmans and Co., entitled "Brian Boru," by "J. T. B.," is the production of a member of the architectural profession.

A new school-chapel, vestries, keeper's-house, &c., are about to be erected for the Wesleyan body in Plymouth-grove, Manchester, from the designs of Messrs. Hetherington and Oliver, of Carlisle. The site is a capital one, and in this preparation of the plans, provision is made for the erection of a large chapel at some future time, to seat 1,000 persons, with a lofty spire 140ft. high. The buildings will be in the Early Gothic style.

The tunnel sewer in course of formation at Boscombe Chine for the discharge into the sea of the sewage of Bournemouth, was burst open, and partially destroyed on Wednesday week, by an influx of storm-water. The mishap, which will cause considerable pecuniary loss, is attributed to the fact that the sewer was begun, in accordance with instructions from the improvement committee, from the inland end in connection with two other large sewers, and the surface-water collected by these, poured into the tunnel to which no proper outlet had as yet been formed.

The Spanish Cortes have voted 100,000 pesetas for the reparation of Cordova Cathedral.

THE NAVE ROOF, ST. ALBAN'S.

A VERY few words will suffice to close this correspondence as far as I am concerned. Any one who will take the trouble to look again at my letter will see that Mr. Scott has omitted to answer it on most points, whilst those on which he does write do not affect the main issue.

He refers at length to his reports. Of these, save one of June 25th, I know nothing. That was complete in itself, and I agreed with it, and have spent some time in supporting its recommendations—hoping when I began that I was helping Mr. Scott's object. It is true that it began by referring to the western part of the roof, but as it finished by speaking of what would then have to be done to the whole of the ceiling, I concluded that the eastern part of the roof had already been dealt with in some report which I had not seen. I will only add that—if language means anything—making an old roof “sound and serviceable” by repairs does not mean erecting a new roof over and independent of it.

If Mr. Scott will read what I have written more carefully, he will see that I have always asserted that the walls of the nave and transepts originally finished at the same level, as consequently did their roofs. The nave walls, being now higher than the transept walls, must evidently have been raised. I have stated this clearly from the first, and cannot understand why Mr. Scott assumes that there is any possibility of my being in doubt about it.

As to the new parapets to the western part of the nave I thought I had made myself clear. The *corbel-table* under the parapet is, I doubt not, a copy of the old corbel table, but the *parapet* above it did not appear to me to be copied from anything of the same age now existing on the church.

I am very glad Mr. Scott is going to have the south transept gable accurately measured. With this, and the old doorways in the tower and the marks of framing on the old timbers in the nave roof, he will be able—as I pointed out to the Society of Antiquaries—to reconstruct on paper, with a close approach to accuracy, the positions and pitch of the Norman roof and the design of the latest high-pitched roof of the nave, to which no doubt the old timbers belonged. These would be very interesting particulars, and I regret that they were not obtained before any illustration of the supposed lines of roof were published. But without this information Mr. Scott's illustration affords—to say the least—very strong evidence against the line, which he calls that of the original roof, being in fact anything of the sort, even if it exists anywhere save in his own imagination.

GEORGE EDMUND STREET.

Everything that can be done ought to be done to discover, and to bring before the public the facts relating to the existing remains, and the evidences of the architectural history of the several roofs which have covered the Abbey Church of St. Alban's.

A fresh interpretation of the facts recently brought out as to one very important detail may serve to throw light upon the proper solution of the present controversy—at all events, as to the true state of the case, whether the eventual result may be affected by it or not. Until recently little has been accurately known, except perhaps to those personally interested in the work, respecting the relation of the existing parapets to the present or to previous roofs, or as to what was really proposed to be done in their restoration or renovation, as the case might be.

Mr. Street's reply to Mr. J. O. Scott's report will have made clear to those who have at all looked into the matter for themselves, what Mr. Scott's report, in the absence of his diagrams, failed to do.

And I must express my amazement at finding it not only supposed but seriously and de-

liberately maintained—1. That the original Norman roof extended so far above the principal string-course of the tower as to cut through the jambs of the windows over. 2. That the lines of the roof-chases in the tower wall, now filled in, but still so conspicuous and so clearly indicative of the original Norman roof, are not the lines of a Norman roof at all, but of a later mediæval roof cut down from the steeper pitch. 3. That this lower roof ever coexisted with the parapets, or would be in any way at all compatible with them. 4. That the present proposal to construct a new steep roof to the lines of this lower roof would preserve in any way or in any sense be a “restoration” of whatever had existed or ever could have existed at any one period.

I do not now propose to enter into the merits of the question as to what ought to be or is to be done by the restoration committee. I can freely admit, as I took the opportunity of doing at the meeting of the Society of Antiquaries, that the high ridge line, if kept within the limits of the apex of the walled-up chases of the original work, would be better æsthetically, and would produce much more nearly than it does at present the effect intended by the original builders, and the appearance which the abbey presented in its palmiest days. But I must confess I do not see how it is to be done in any way which shall be compatible with the principles of “faithful restoration,” and I do most emphatically protest against its being urged or attempted upon any one of the grounds set forth in the four propositions enumerated. Let it be done as “the best thing” or as a “vast improvement,” as a necessary expedient, as a legitimate development of 19th century work, as a concession to weakness, or as an irresistible act of irresponsible power, only let it not be promoted and defended upon grounds which shall utterly stultify the boasted enlightenment of the present generation in the study and preservation of mediæval architecture.

I speak strongly, but surely not more strongly than the rights and the urgency of the case demand, and I will be no party to this question being made a personal matter; but when eminent amateurs charge the whole architectural profession with ignorance and with wanton destructiveness it would be doing a lasting injury to the interests which we have at heart to let pass such flagrant vandalism as that of the triumph of might over right in these days of free enlightenment and investigation. And this is the more needful at the present time, and in the present instance, when an energetic body of men, self-constituted for the very purpose of the “conservation of ancient remains,” has left the battle of conservation to be fought out single-handed by those whom it has thought well to denounce in no measured terms for their wanton destructiveness. There has been “much cry and little wool.” They seem to have taken no steps—at all events, no effectual steps—either for investigating the facts or of appealing to the popular enthusiasm for the conservation of the ancient remains. Discretion has proved, in this case at least, the better part of valour. It would have been a thankless and up-hill task for them to have undertaken; and the preliminary investigation is one from which they might well shrink. Much has been said in the public papers, but no sufficient information which could be relied on had been given as to the structural question now raised when it was announced that the steep roof was already decided on. And in August last I wrote to the *Times* suggesting that there ought to be a conference of architects to investigate and report upon such existing evidence and indications as could be discovered, and had not, up to this time, been communicated to the papers, in order that the public might be in some position to appreciate what was going on. Being the dull time of the year the *Times* seemed to think such a suggestion superfluous. Happily, the same idea occurred to other minds, and through the instrumentality of the conservation committee of the Institute the conference was held of which we now have the result.

My own visit to St. Alban's was an entirely voluntary and independent one, and the section, which I made showing the line of the Norman roof to have been at an angle of about

45° with the horizon, and to have run down on to the corbel-table, from which the parapet springs, agreed with the section exhibited by Mr. Street. The remains which are actually found to exist accord accurately with what naturally would be expected by the circumstances of the building, and by comparison with others of a similar character. The angle of slope, the position of ridge, the relation to the corbel-table, the indication of the line of rafter on the original walls, the relation of the rafter-line to the corbel-table, all go unmistakably to corroborate each other as to its original date and treatment. It is true that doubt has been thrown upon the date of the corbel-table, but I think an examination of its construction and of its section, of which Mr. Neale has kindly favoured me with a full-sized profile, convincingly shows it to be the original one. It is equally clear that the string-course immediately over it, and forming, as it were, a part of it, was an addition of the 14th century, when the parapets were built—when also it is probable the angle bridges against the tower were added. This, however, is not of so much account.

Now, the alleged traces of the steeper roof upon the tower walls, which have been so effectually obliterated as to be scarcely visible, are almost ignored by Mr. Street, and according to the clerk of works always were very dubious. It seems, however, according to Mr. Scott, that they really existed, and indeed were regarded by him as indicating the line of the Norman roof. No other attempt seems to have been made either to explain them or to explain them away, excepting that Mr. Street very properly denies that such a roof could have been the Norman one, unless it were *lifted* when the walls were raised. Neither of these suppositions will be found to be satisfactory as an explanation of the facts.

There is, however, as yet nothing to show the exact or even the supposed line or angle of this high roof, and until Mr. Scott shall have produced this it may be difficult to explain it satisfactorily. But apart from the evidence of its existence being established it is not only possible, but probable that such a roof with parapets may have been put up in the 14th century above the old line of the Norman roof, and cut down again in the 15th or 16th century, not to the intermediate pitch of about 45°, but to the present flat one, 18°.

This supposition will account for the existence of the string over the corbel-table being of the 14th century, at which time the parapet would be first built, and also for a subsequent raising, perhaps in the 15th or 16th century, of the wall, and probably of the parapet also, when the roof was cut down.

A very customary and probable slope for such a roof within a parapet would be an angle of 60°. Neither the carrying up of such a roof, cutting, as it is said to have done, into the windows above the string, nor the cutting it down again below the ridge of the original one, would be at all at variance with the practice of the men of the respective periods. It is what we find again and again has been done, and it will reconcile with each other the conflicting difficulties raised.

All this, however, will not go to remove the difficulty, but rather to increase it, if the old roof be doomed to destruction. It would be preposterous to raise the ridge of a new roof beam to cut into the window over the principal string, and it would be impossible to follow the line of the old Norman roof with the existing parapet. The only mode of dealing with it would be indefensible, except by way of radical innovation. The striking out of a new line of rafters from the present gutter to the line of the old Norman ridge would be an expedient, possibly a deplorable one; but by no treatment short of destroying all the present parapets could there well be a restoration to what it was at any period. Possibly the committee may resolve still that radical innovation will be the best way out of the difficulty, only let it not be called “faithful restoration.”

This course will at all events disarm the power of future adverse criticism by destroying the only vestiges by which it could be made effectual. Of the condition of the roof I am not prepared to speak. I have been told that it is in such a state that, though an estimate

has been given for its repair, the builder would not undertake it as a contract. On the other hand, it has been reported well capable of repair. And if it be so there seems no reason for replacing it with one upon new lines, and essentially of modern construction.

WILLIAM WHITE, F.S.A.

My communication in your last week's issue contained a few inaccuracies which crept in owing to its having been written in a hurry, and corrected by means of post cards. Speaking of an expression I had used previously, which was liable to be misunderstood, I am made to say that it had no "reference to himself." This should have been "myself." At the end of my letter, it is stated that certain work "was all done before I came on the scene." This should be read, "was all arranged for." The other inaccuracies are only verbal.

J. OLDRID SCOTT.

THE LEGAL RESPONSIBILITIES OF ARCHITECTS.—II.

(Continued from p. 703, Vol. XXXV.)

AN illustration of the American practice is found in the case of Newman v. Fowler, decided in New Jersey in 1874.

A house after completion proves defective; the report of the case does not say in what respect, but it is found that there was want of care and skill on the part both of the architect and of the contractor. On the principle that when several persons are concerned in inflicting injury upon a man, any one of them is liable for the whole damage, and that the person wronged may choose which he will compel to pay the indemnity, the owner sued the architect for the entire damage. The jury was charged that where the negligence of the contractor was such as to be discoverable by the exercise of reasonable care and skill on the part of the architect, the architect and the builder were alike responsible; for the effects of negligence of the builder beyond this measure, he alone was responsible. In this case the negligence or unskillfulness of the architect being admitted, his sameness of accountability with the builder was a necessary consequence, and the owner had a right, if he chose, to obtain from him the full damages, and judgment was given accordingly.

A point in this case is interesting. The owner had kept back a part of the contract price from the builder, on account of defects not specially described. The defendant's counsel claimed that by so doing he had already obtained indemnity from the builder, and could not demand further damages from the architect. The judge's reply was that if the builder had sued the owner for the balance of the contract money, and the defence had been that it was retained on account of the same defects for which the present action was brought, and the defence had prevailed, it would have barred the present action against the architect, since the owner was not entitled to obtain damages twice over—once from the contractor and again from the architect. But in fact the builder has not sued for his money, and there was no evidence that the owner might not have retained it on account of other defects than those for which he was suing the architect, so that the question of the retained balance was still open and undecided, and could not be considered in the present action.

Another case, decided in Missouri in 1876, gives an idea of the care which the law considers to be required of architects. A building was in process of construction, and iron columns and girders had been set to carry some portion of it. By defect, probably of the foundation, two of the columns settled after the weight was brought upon them. The architect proposed to raise them with the girders resting upon them, apparently so that they might be underpinned. It was in evidence that one of the contractors who furnished the ironwork, hearing the architect propose to apply jack-screws under the caps of the columns, advised him not to do so, as he did not think the existing strong enough; but the owners took the architect's view, and on his recommendation employed a professional building mover for the work. It appeared that there

was some stipulation that this man should work under the direction of the architect; if it had not been for that, the judge's opinion was that the architect would not have been liable for the improper management of the raising which was alleged by some of the witnesses. On the application of the jack-screws the cap of one column broke at the corner, and the flange of the compound wrought iron girder resting on it bent, allowing the girder to fall, bringing down a wall with it, and killing a workman employed in the building, whose widow sued the architect for compensation for her loss. The architect himself was not in the building at the time, but knew and approved of the method adopted to effect the raising. The judge charged the jury that if they found that the disaster was due to an improper method employed for effecting the raising, or because of inadequate supports for the screws or unskillful application of them to the columns, while the work was under control of the architect, he must be held to have shown negligence in business which he undertook, though he failed to show the care and skill which, having undertaken it, the law imposed upon him, and was liable for the damage resulting from his negligence. Some of the testimony went to show that the design of the girder was bad, and that the columns were weak and badly cast, and the jury were charged also that if they found that defective ironwork was the origin of the accident, and that this was designed by the architect in an unskillful manner, or was defective by means of bad material or workmanship, which could have been discovered by the defendant, in this case also he was guilty of a negligence which rendered him liable for injury resulting from it. The judge thought that the absence of the architect at a time when so critical an operation was going on was in itself a failure to show the care required of him, and thought also that he was guilty of neglect in not having the strength of the caps of the columns tested before subjecting them to so severe a strain; and the jury taking a similar view, the defendant was obliged to pay the amount claimed, 5,000 dollars. The court, in this case, was of opinion that the owners of the building were liable, together with the architect, but it is not very evident why; and in an English case of manslaughter from the falling of a building, the owner, who proved that he had given orders for good and substantial work, but knew nothing of construction himself, and had not controlled the details of the execution, was discharged.

The professional man must not forget that the damage for which he may render himself liable by remissness in duty extends beyond loss by deficiencies in the construction. A distinguished architect in London was accused of negligence in failing to prepare plans for a certain alteration with due rapidity, and the proprietor, who let the rooms in the building to lodgers, claimed the profits which he would have derived from his house if the work had been finished without delay, and the court decided that he was entitled to recover them. It would seem, therefore, that there is no want of law to hold the architect to his duty to his employer; but if the courts set up a high standard of professional diligence and skill, it must be acknowledged that their requirements are on the whole reasonable and just to all the parties, and the practitioner, conscious of having done his work with faithfulness and skill, can appeal with confidence to a jury against the oppression of an ignorant or avicious client. Every step that is made toward a clearer definition of our duties helps us to a recognition of our rights, and if the public should learn to hold us generally to a stricter accountability and a higher standard of skill, those who desire the advancement of the profession will rejoice, not only in the necessity for higher attainment, but in the increased respect and easier relations with the world which recognised acquirement and responsibility will give.

But there are certain branches of an architect's duties towards others than his clients, which are by no means so well defined. An important case decided in the House of Lords after long and costly litigation raises a very interesting point. A contractor named Thorn

was invited to estimate on plans and specifications for rebuilding the Blackfriars Bridge. His bid was accepted, and a contract, of which the specification formed a part, was signed. The engineer had designed to construct the bridge piers by means of iron caissons, sunk in the river and filled with masonry, and the plans and specifications were drawn to that effect. In execution the caissons proved too weak to sustain the water pressure, with the force of the current, and the upper part had to be removed, and the work finished by the slow and costly process of building only when low tides permitted. When the bridge was finished the contractor sued the Mayor and Corporation for damages for the insufficiency of the plans and specifications, alleging that by offering them for estimates the Corporation virtually guaranteed that the bridge could be built in accordance with them. The Corporation replied that there was no guaranty, express or implied; that while they placed confidence in their engineer, Mr. James Cubitt, they did not pretend to warrant his work; that the contractors knew as much of him as the Corporation did, and if they had wished, they could have had an engineer of their own examine the plans and pronounce as to their practicability, and if they had then wished to withdraw their proposal they might have done so; and the unanimous opinion of the judges was that this defence was a good one, and judgment was rendered for the Corporation.

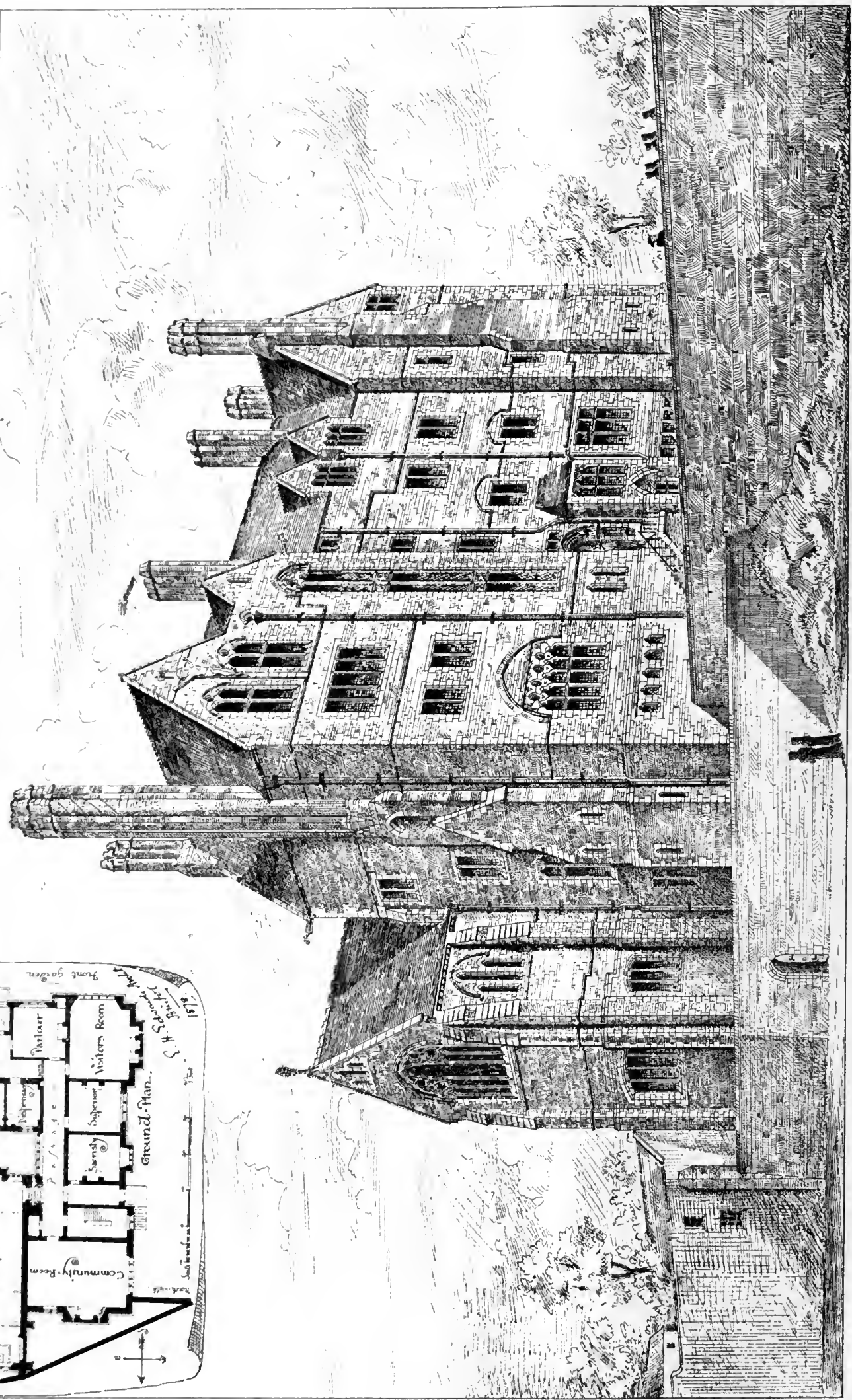
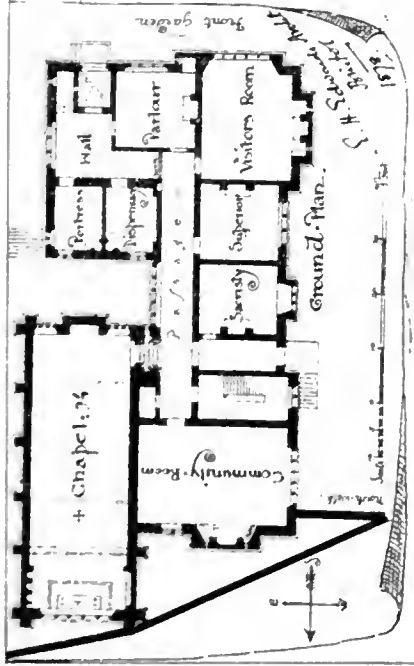
According to the Lord Chancellor, the same principle should apply in every case where a man employed an architect to prepare plans and specifications, and invited estimates upon them.

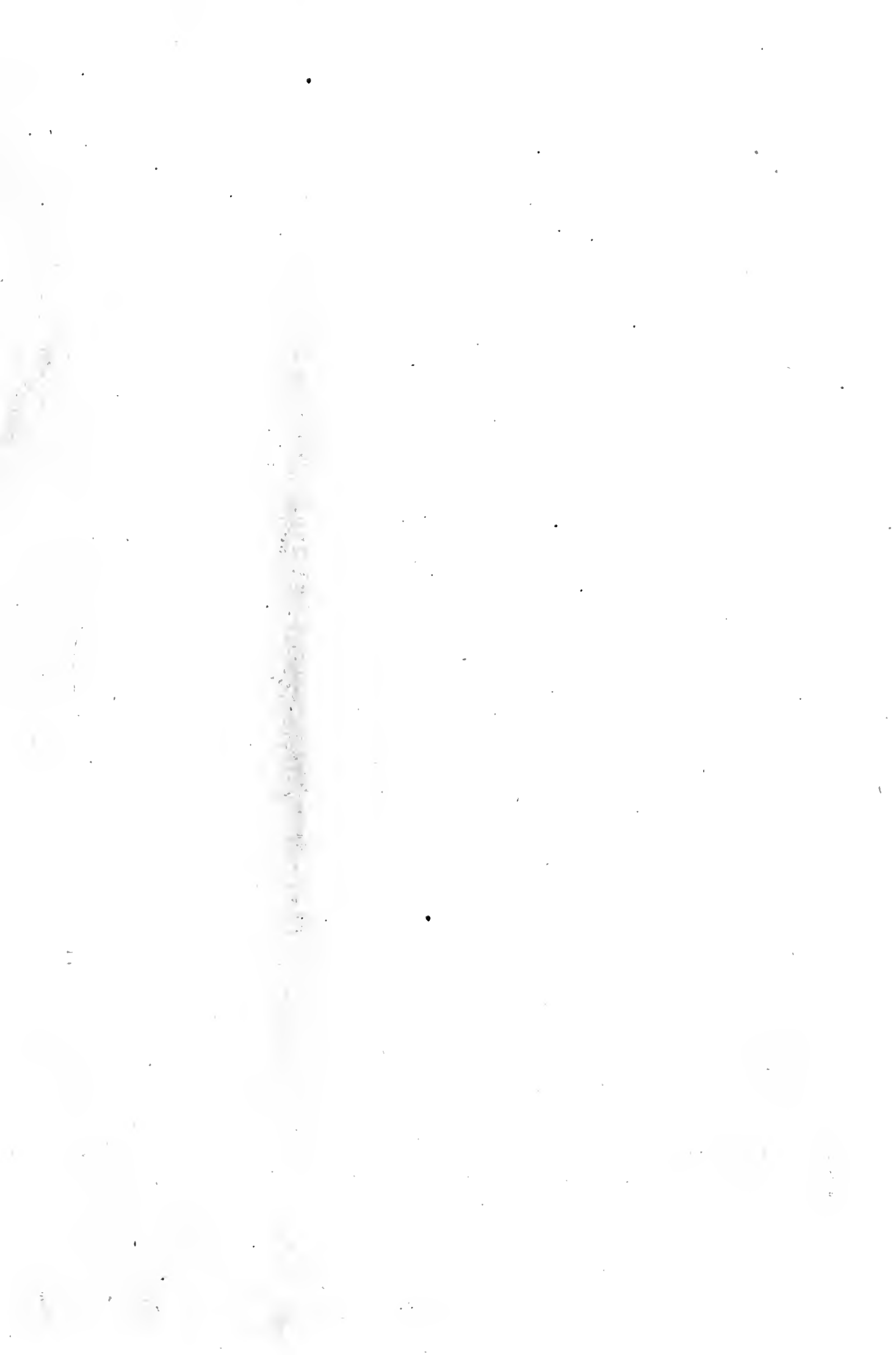
It being thus settled that the first party to a contract does not guarantee the plans and specifications which form a part of the contract, it is of the highest importance to determine whether the expert who drew them could be understood to have guaranteed them. In the case of the bridge the engineer was dead before the action was brought, unfortunately for his professional brethren, who could have derived much instruction from seeing the result of a suit brought against him; and there appear to be few or no recorded cases of the kind, unless in French practice.

Another subject which gives trouble to a conscientious architect is the proper adjustment of his duties between the builder and the owner. In case of dispute between the parties to the contract, he is made the judge by universal custom, and even in court the architect's position as umpire between owner and contractor is so well recognised; that his testimony is generally the most important part of the evidence; yet how does such a position agree with the rule of law that a man can act only in behalf of one person at a time? The owner engages him, and bears alone the cost of his employment; is he not then solely the agent of his employer? And if so, how can he act as umpire between his principal and the opposing party?

That this is a serious question every one in practice has occasion to know. Cases happen every day in which a contract open for estimates is awarded at a price which the architect, who has the other bids as well as his own judgment to guide him, knows to be less than the value of the work; is it his duty as agent of his employer to accept the proposal which he sees to have been based on some misunderstanding or error, and set himself to drawing up a contract so framed as to protect his principal from loss in case of the bankruptcy of the builder which he knows to be inevitable? Or has he a right to constrain his principal to accept a bid at a fair price, or to call the attention of the incautious bidder to the probability of an error in his estimate? If he takes advantage of the ignorance or carelessness of the builder, to the benefit of his employer, has not the builder a ground of action against him? And if in pity for an honest mechanic who has made a mistake in adding up a column of figures, or who, not being very expert in reading manuscript, has been unable to spell out all the words in the specification, he has given him a hint of his misunderstanding, has not the owner, who is thereby obliged to pay a larger sum than with skilful management he otherwise would have needed to spend, a right

N.W. view of NEW HOUSE of CHARITY - S:RAPHAELS - BRISTOL: 22 22 22 22 22 22





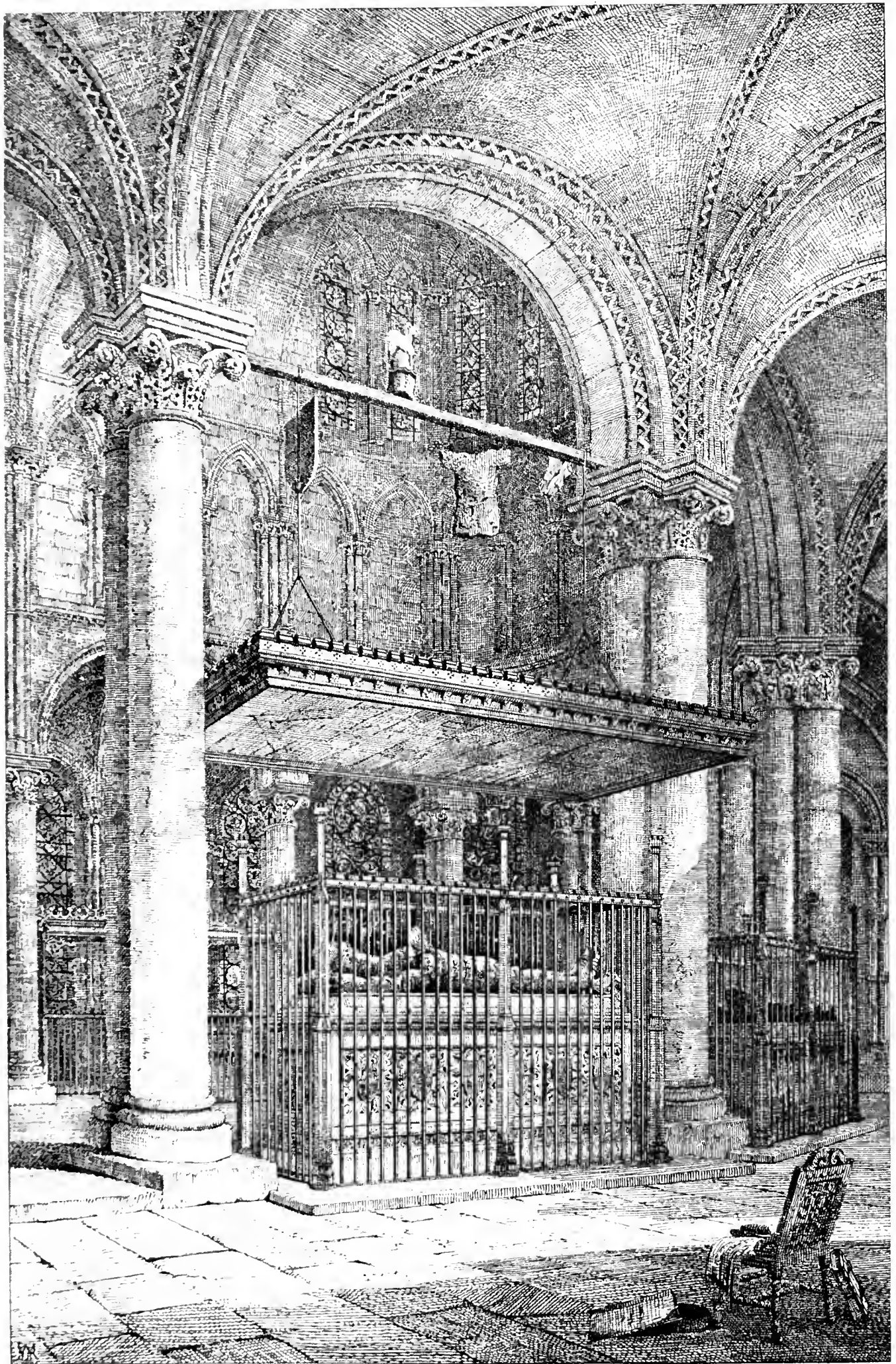
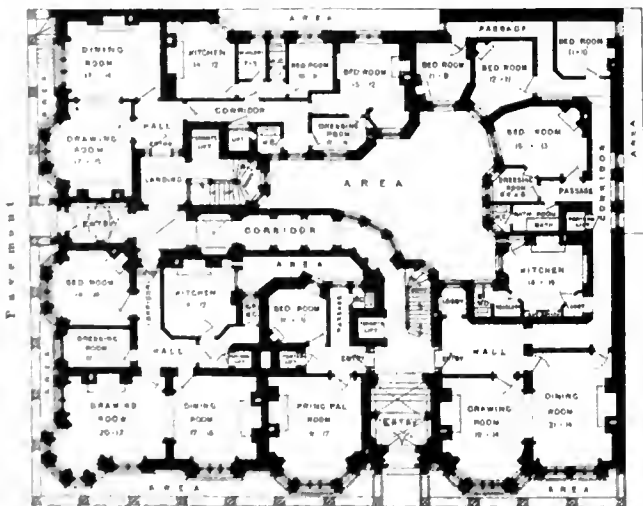


Photo Lithographed & Printed by James Akerman, to Queen Square, W.C.

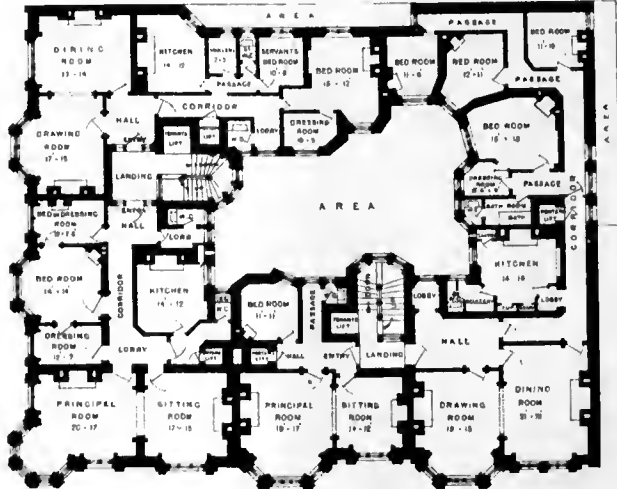
TOMB OF EDWARD THE BLACK PRINCE CANTERBURY



ALEXANDRA + MANSIONS + VICTORIA + ST + WESTMINSTER + FRANCIS BUTLER, ARCHITECT.

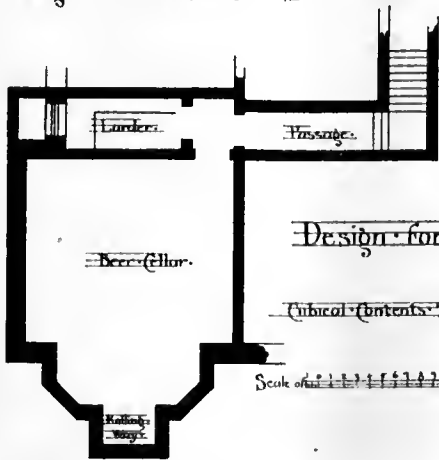


GROUND PLAN



FIRST FLOOR PLAN.
VICTORIA STREET

Design Placed **SECOND**.



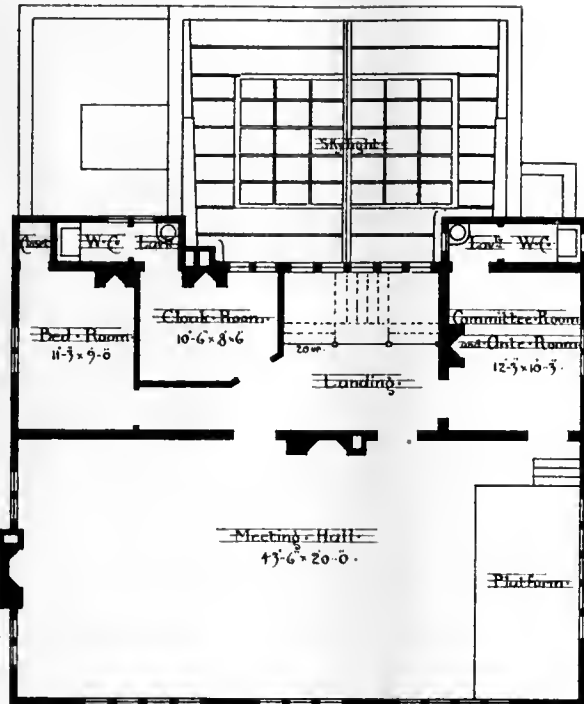
Building News Designing Club

Design for Village Club House

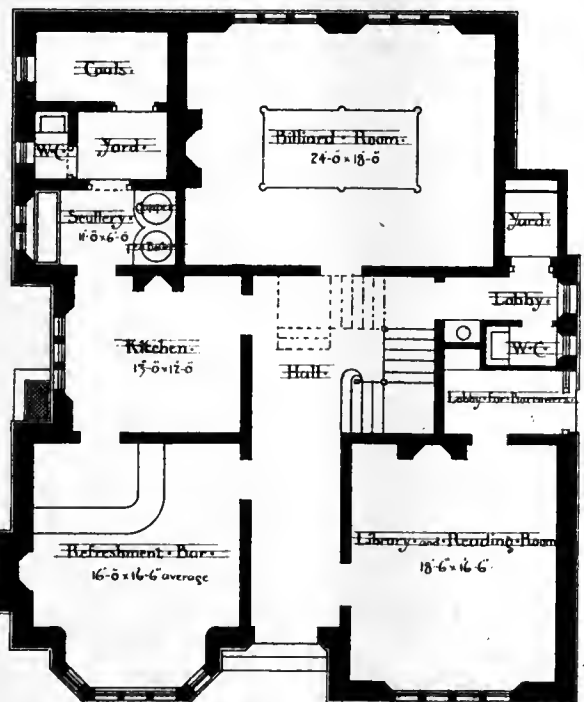
Cubical Contents 7974 feet at 6 per foot = 149520

Scale of 1" = 12 feet

Basement Plan



Chamber Plan

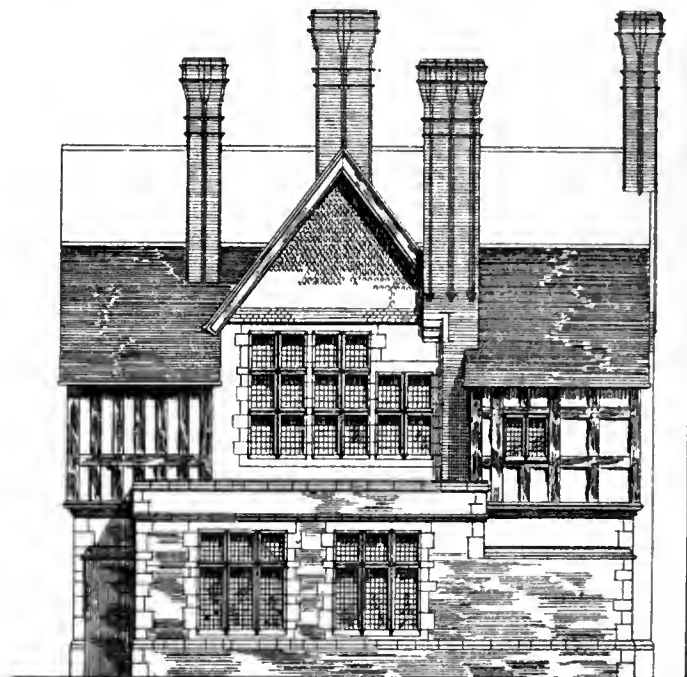


Ground Plan

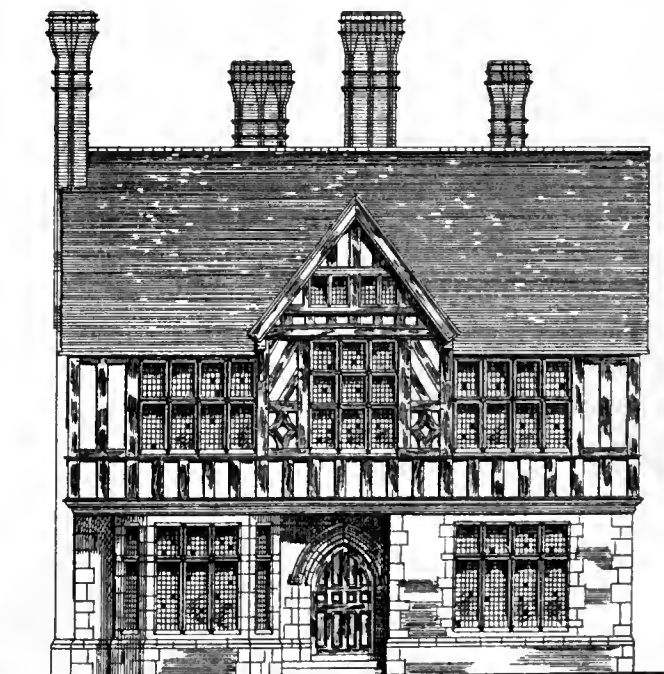


Sketch View

(S)



Back Elevation



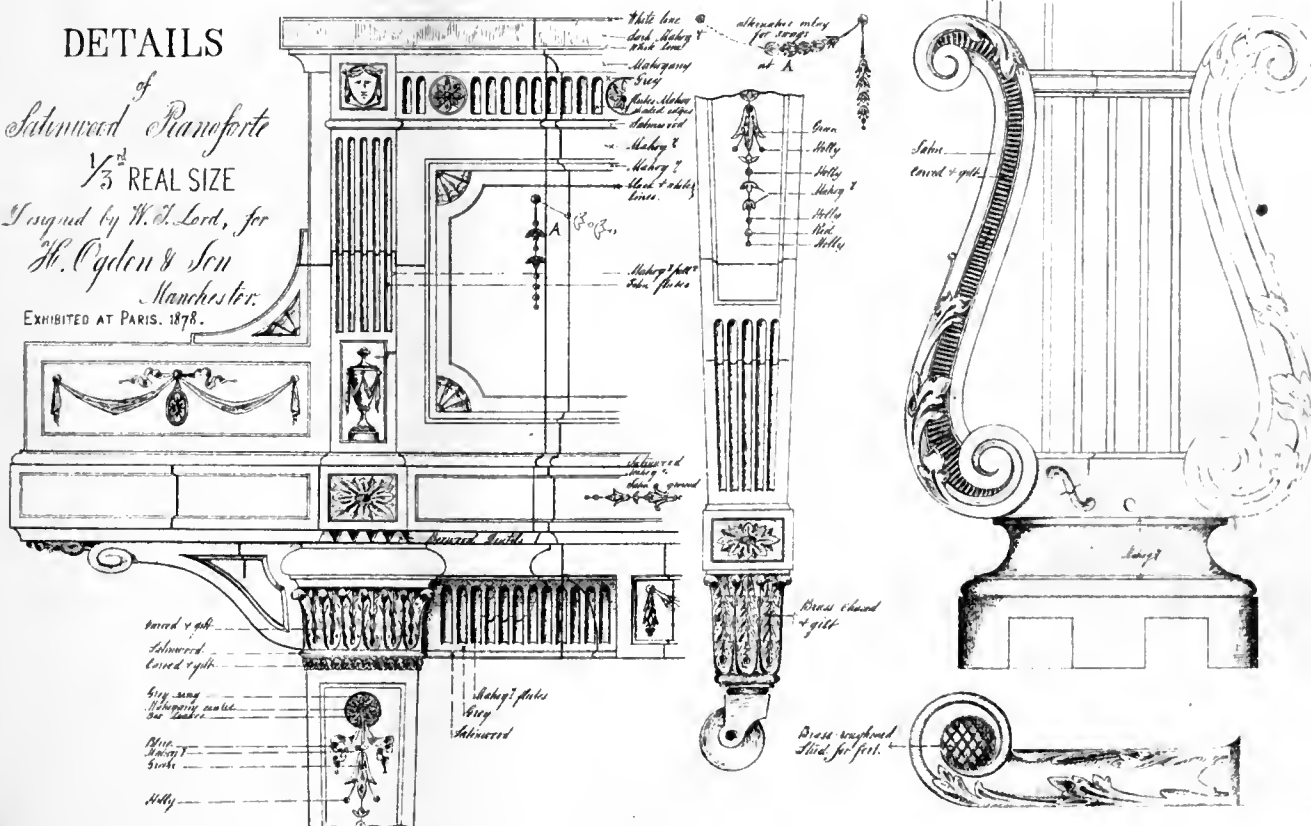
Front Elevation



DETAILS

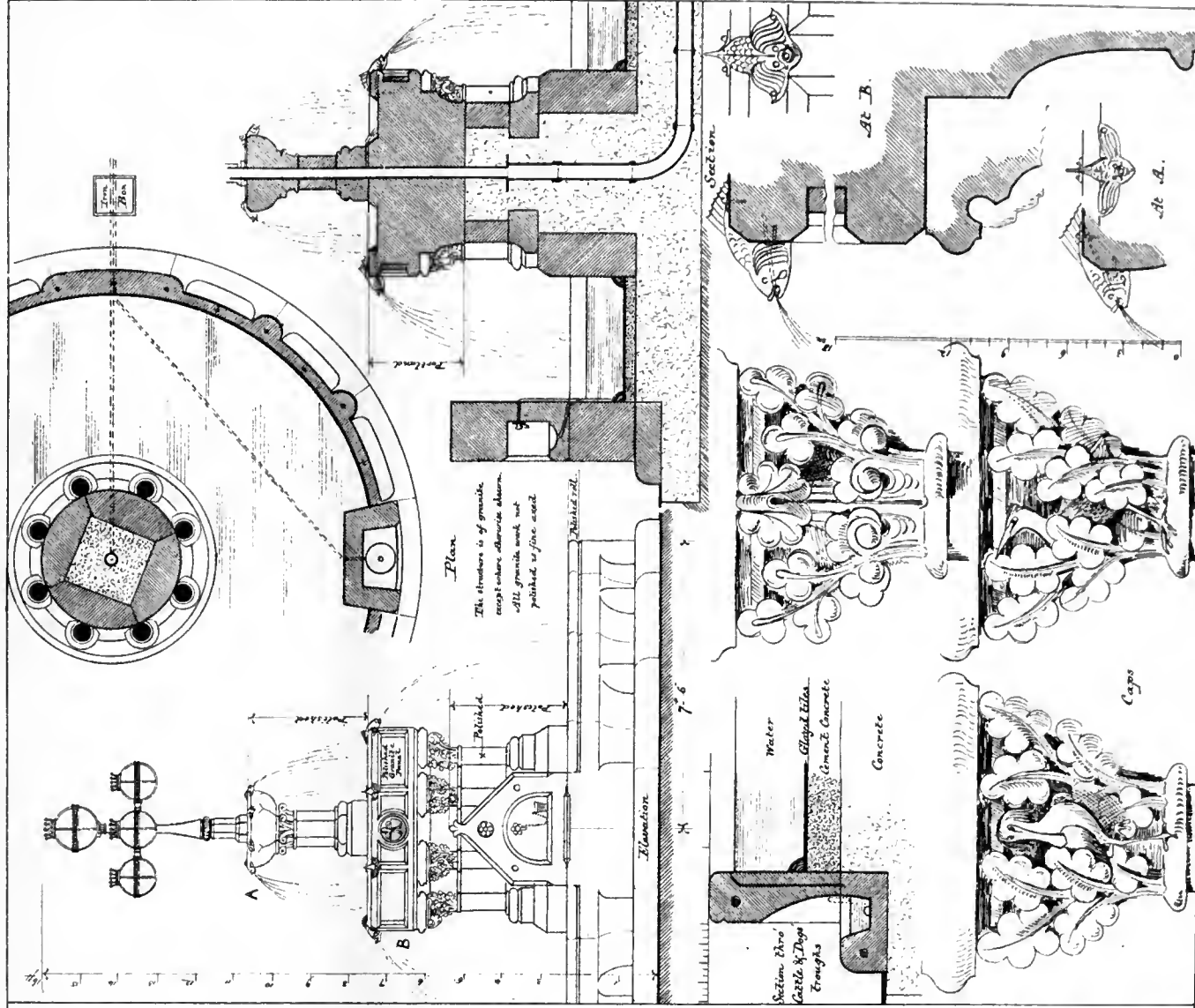
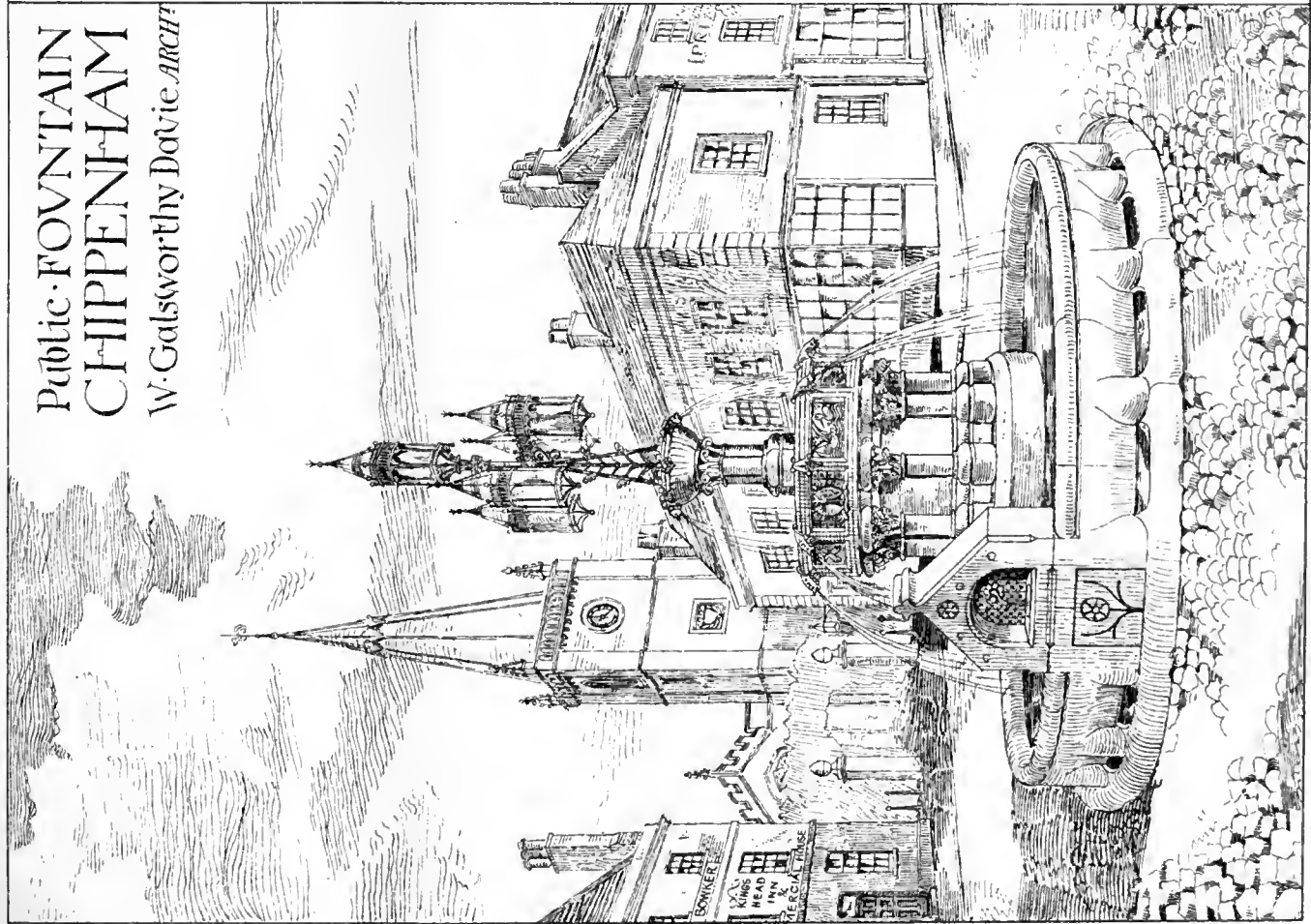
Satinwood ^{of} *Pianoforte*
1/3rd REAL SIZE

Designed by W. H. Lord, for
H. Ogden & Son
Manchester.
EXHIBITED AT PARIS. 1878.



Public·FOUNTAIN
CHIPPENTHAM

W. Galsworthy Davie ARCH?



to accuse him of unfaithfulness to his trust, and to claim damage from him?

Such questions have a serious bearing not only on the professional conduct, but on the peace of mind of a conscientious practitioner, and any discussion or citation of cases which have been decided that may tend to a general understanding and uniform practice in similar matters is one of the many things of which the profession is in great need.

HEATING HOUSES BY STEAM.

THE system of heating houses by steam, inaugurated in a very modest way at Lockport, New York, not without serious misgivings, has, according to the *English Mechanic*, hitherto worked so well that an experiment is to be tried in New York itself. The Holly system, as it is called, consists simply in laying on steam to houses in much the same manner as gas or water is laid on, the steam being generated at the "works," and conveyed through pipes, properly clothed with some non-conducting material, to the places where it is to be used. The first experiment was made at Lockport, near Niagara Falls—a town situated a little north of the 43rd parallel of N. latitude. In June, 1877, the experiments were commenced by laying half a mile of pipes underground to obtain a datum for calculating the carrying capacity of tubes, and the rate of loss by condensation. The results were encouraging, and before the winter set in about three miles of piping, mostly 4in., had been laid down, the greatest continuous length being one mile and a third. Although Lockport is some 8° nearer the equator than London it is considered to be a cold region, and the test made by the company in the winter of 1877 was, therefore, regarded as practically demonstrating the feasibility of the scheme. Since the commencement of their operations the company has efficiently warmed about forty houses, a large school-room, the town hall, and, besides supplying steam for other purposes, have run two steam-engines, one of them situated about half-a-mile from the boilers. Some of the houses were more than a mile from the source of heat, but were warmed as satisfactorily as those near the boilers.

Steam heating will enter a new phase of its history in the spring, for in spite of much opposition the promoters of the Holly system have convinced the Mayor of New York of the advantages of their scheme, and he has recommended the Board of Aldermen to give the Commissioners of the Sinking Fund power to grant privileges to certain persons to carry steam for heating purposes underground in New York city, and as this recommendation is tantamount to a grant of the privilege, it is supposed that some portion of the city—perhaps a quarter of a mile or so square—will be granted the Holly combination. The proposals of the companies cover a wide field, but as it is essential to the success of the plan to utilise the steam to the utmost, it is probable they are not overstrained. It is proposed, first, to heat houses, offices, depots, &c.; to cook by steam in one of several patented stoves already invented; to heat water, to put out fires, and to clear the streets of snow. Figures are of course brought to bear on the question, and we give them here for what they are worth. To warm the public buildings of New York costs now £120,000 a year, whereas with steam it could be done as efficiently at an outlay of £30,000. For removal of "ashes" a sum of £45,000 is annually paid in New York, but ashes include rubbish and snow, so that it is only the ashes proper that can be taken into account, and their removal costs in reality nothing at all; still, there is an avoidance of the nuisance of ashes which every housewife will appreciate. Five shillings a load is now paid for the removal of snow, but with a system of steam hydrants and hose it is stated that a "load" can be melted in 20 minutes at about one-tenth of the present cost. By dispensing with fires in houses it is estimated that insurance rates would be reduced by at least 1 per cent., while there would be no expenditure of labour in cutting wood, carrying coal, and attending furnaces. The arrangements inside the house are of so simple a character that a child might

regulate the whole apparatus, while the company can control the pressure so as to supply any house with steam of 200lb., 20lb., or 2lb. if needed. Exactly how that is done we are not informed, and in the absence of details we may venture to doubt the accuracy of the statement, as we do the assertion that the companies can supply steam-users with power at one-half the cost from their own boilers. The experiment to be made in New York will be watched with much interest, and though there is small likelihood of the plan being tried here on a large scale, there is no reason why some of our large establishments should not make the experiment, and make it successfully.

SKETCH OF OLD LONDON.

WE lately noticed a very interesting collection of views and maps of Old London arranged for exhibition at South Kensington by Mr. Crace, senior, and we have now on our table "A Sketch of Old London its Streets and Thoroughfares before the Great Fire of 1666," by Mr. J. G. Crace, his son, being a reprint of an address on the subject delivered by the author at the Society of Arts at the request of the Council. Of course we lose some of the interest in the absence of the splendid collection of prints by which the address was illustrated, and we hope Mr. Crace will, on some future occasion, amplify his lecture into a volume, in which case a few of the maps and views would be a pleasing introduction. The foundation of the City of London is very obscure, and Mr. Crace does not throw any new light upon it, though he says it is certain that the city existed before the Roman occupation of Britain. A remarkable fact recorded by Mr. Crace is, that no mention of London occurs in the Domesday Book, though in King Henry II.'s reign Fitz Stephen, a monk, wrote "A Description of the Most Noble City of London." The author quotes at some length from this document, which will be read with interest. The early chronicler speaks highly of its wealth, great trade, and grandeur, of the politeness of its citizens, the three principal churches, and says "the matrons of the City are perfect Sabinas." Up to this time (the 12th century) written descriptions only exist, but Mr. Crace's narrative properly begins at the 16th century, for it was not till that time any reliable plans or views of London existed. The author then draws a graphic picture from the fine maps and views collected by his father, and which we have already glanced at. He begins by referring to a very interesting view, copied from a Dutch drawing by an artist named Van den Wayngerde, now in the Bodleian Library, forming one of a series supposed to have been drawn for Philip II. of Spain, about 1540. We have referred to this map in our previous notice. The map of Ralph Aggas, the earliest plan known to exist, engraved in 1563, is then mentioned, after which the view by Visscher, published in 1615, a fine view by Hollar, engraved in 1649, a map by Newcombe, 1645, &c., are given. Mr. Crace, in his pleasant imaginary journey from Oxford to the City by way of Oxford-street, then called the "Way to Tyburn," gives us some interesting facts. The village of St. Giles, with its hospital and church, the road called Holborne (after the "Old Bourne"), Chancery-lane, Ely House, St. Sepulchre, Smithfield or the "smooth field" as it was called, are commented upon. Passing in review other memorable parts, he reminds us that Somerset House was designed by John of Padua, for the Protector Somerset, and was built on the site of the Bishop of Worcester's and other houses; that Durham House was the residence of the bishops of that see, and afterwards of Dudley Earl of Northumberland; that Sir Walter Raleigh resided there, and subsequently that it fell into the hands of Robert Earl of Salisbury, who demolished the stables next the Strand, built an exchange called Britain's Bourse, after which, in 1770, the Brothers Adam built the Adelphi-terrace. Westminster is next described, also Old St. Paul's; and the picture is finished by a reference to changes in the latter half of the 17th century, and by a quotation from Evelyn's Diary of his account of the great fire, which began on the night of September 2nd, and which, in a few days, completely destroyed Old

London. We commend Mr. Crace's pamphlet as a guide to those who visit the large exhibition of engravings at Kensington.

HOUSE FITTINGS FOR WATER SUPPLY.

TO the "Suggestions" issued by the Local Government Board, and referred to by us last week, some useful appendices are added. We may more particularly allude to appendix E, on "Regulations as to House Fittings for Water Supply in the Metropolis settled by the Board of Trade." These regulations were made under the Metropolis Water Act, 1871, but are little known, and will be found of some value to other towns. We may specially draw attention to the thickness and weight of lead pipes for the conveyance of water, the weight per yard lineal being given. Thus, for pipe of 3in. bore, the weight is fixed at 6lb. per lineal yard; for 3in. 7/16in., for 3in. 9/16in.; for 1in., 12lb.; and for 1 1/2in., 16lb. per yard. We are not fully satisfied that these weights are adhered to in all cases, and we should like to know what test they are subjected to—if any—to ascertain if the pipes are of uniform thickness throughout. In frosty weather the constant bursting of pipes becomes a serious item to landlords or tenants, and, as the water rates are excessive, it is only just that the householder should be protected against the inconvenience and loss through inferior pipes being introduced. As regards "communication pipes," rule 5 makes it compulsory for every house supplied with Company's water to have its own separate pipe—except in those cases where a block of houses belonging to one owner is concerned, when, if not contrary to the special act of the Company, one sufficient communication pipe may be provided. Again, a very important regulation in respect of connection by "stop cock" is to the effect that every connection with the Company's pipes is to be "made by means of a sound and suitable brass screwed ferrule or stop-cock with union, and such ferrule or stop-cock shall be so made as to have a clear area of waterway equal to that of a half-inch pipe." How often this is overlooked, and again the next regulation that every external pipe shall be jointed with what is called a "plumbing" or "wiped" joint. It is surprising to find so many houses without that very indispensable addition of a stop-valve, which clause 12 states is to be fixed "at or near" the point of entrance of the communication pipe to the premises, or if desired within the premises. It is required to be of the screw-down kind with an area of waterway not less than that of 3in. pipe, or greater than that of the pipe itself. Coming to cisterns their accessible position for inspection, and cleansing, and covering are provided for, though how many we should like to know, even within the jurisdiction of the Metropolis Water Act, set this rule at variance? Again, in reference to draw-off taps, we may enter many houses and find them unsound or leaky; while in numerous closets (rule 20) that every boiler and w.c. "shall be served only through a cistern or service box without a stool cock" is not strictly observed. The fact is, many of the old fittings have been made to do duty. It is obvious, on reading these regulations, that good as they are, they have been made mainly in the interests of the water companies, and not altogether to insure the householder's convenience or to save his pocket, or we should have seen a more efficient regard paid to strong water pipes and the position and covering of cisterns—matters which at present may be found in every conceivable condition of unsoundness, neglect, and inefficiency.

For the first time during a period of thirty years Lord Pearlyn's extensive slate quarries in Carnarvonshire were on Friday last closed, directions having been given that, owing to the dulness of trade, the quarries, until further notice, will not be opened on Fridays and Saturdays. The like rule has been enforced at Mr. Assheton Smith's Llanberis quarries, and generally throughout the quarrying district.

The new Stock Exchange in Anglessea street, Dublin, was opened on Tuesday week. Messrs. Miller and Symes, of Great Brunswick street, were the architects, and Mr. George Meyer, LL.D., also of Dublin, was the contractor. The cost has been about £12,000.

OUR COMMONPLACE COLUMN.

FLUES.

FLUES for ordinary fireplaces need never be more than 9 in. square when in brickwork, or 9 in. in diameter when formed with pipes or in concrete. In open fireplaces the throating should be formed directly over fire-space, and kept as low as possible, so that the air passing up the flue may be heated. Flues should run direct to outlet, no bends being introduced with a less obtuseness than 130°, unless soot doors are provided. They should be rendered smooth, so that the smoke may ascend freely. Each fireplace should have a separate flue. They are best arranged in cross or party walls, and collected in a shaft springing from ridge, so as to preserve a uniform temperature in the flues, and prevent the smoke being chilled until it nears the outlet. For the same reason flues in external walls and in long shafts should have a thickness of at least 9 in. outside. A similar thickness is preferable inside, to prevent danger of firing floor or roof timbers. Flues should be carefully cored after completion, so as to remove obstructions. To prevent draughts the outlets from flues must be carried above the ridge, and not overtopped by adjacent buildings.—C. W.

FOLIAGE.

IN architecture and sculpture this holds such an important position that we have taken the liberty to extract at some length from M. Viollet-le-Duc. Before, however, doing so, it will be as well to enumerate what forms are chiefly used in English carving. These are:—Oak leaves and fruit, vine leaves and fruit, ivy, and herb benet. Under the title "Flore," M. Viollet-le-Duc gives in his "Dic. Rais." an elaborate and exhaustive article upon the subject. The following are translations of portions:—"We have often had occasion to speak of the flora of sculpture and architecture of the middle ages. It is, in effect, that architecture possesses its flora which modifies itself accordingly as art progresses and declines. During the Romanesque period the flora is but little more than an imitation of Roman and Byzantine sculpture; whilst there may be perceived, towards the beginning of the twelfth century in certain Romanesque buildings, a manifest tendency to seek the models of sculptured ornamentation amidst the plants of the woods and fields. But how did this research begin? To what elements does it attach itself at first? Who provokes it? How did it set up for a system to arrive at forming a school? It seems, in examining the monuments, that the monks (*clunisiens*) were the first to form schools of sculpture, going to search in natural productions the elements of their decoration. The capitals in the nave of the abbey church of Vézelay are no longer debased imitations of antique sculpture; their sculpture vegetation possesses a physiognomy which is natural to it, which has the crudeness of a new art rather than the barbarous impression of a died-out art—the reflection of traditions grown old. On the banks of the Loire, the Garonne, in Poitou, and in Saintonge, at the beginning of the twelfth century, may be seen sculpture sought from other elements than those left by antiquity. The attempts are always partial; they seem to belong to isolated artists, tired with always reproducing models of which they no longer conceive the meaning, because they were no longer acquainted with their origin." M. Viollet-le-Duc instances a capital from the abbey church of Boug-Dien, near to Châteauneuf (Déols), the sculpture of which dates from about 1130, and is based on the leaves of the brake (*Pteris*). "The sculptor here was neither inspired with Roman traditions nor with Byzantine ornamentation; he has gathered a sprig of the brake, has with curiosity examined it—he is enamoured with a passion for this charming production of nature, then he has designed his capital. The forms which the lay school adopt after breaking away from the traditions of the monks, the mouldings which they draw, the sections which they cut, and the ornaments which they sculpture, are based on principles foreign to Roman art. Examination and research replace tradition. When they have to do with ornament they no longer wish to look at the old capitals—Roman friezes—they go into the woods, into the fields,

they look amid the grass for the smallest plants, they examine the young shoots and buds, their flowers and fruit; and these are what, with their humble flora, compose an infinite variety of ornaments of a grandeur of style, a vigour of execution which leave far behind the best examples of Romanesque sculpture. Let it be instinct, let it be reasoning, these artists conceive that the smallest plants, like insects, are endowed with organs relatively much stronger than trees and the principal animals destined to live in the same midst. The forms of the smallest insects, like those of the smallest plants, have an energy, a purity of outline, a vigour of organisation which marvellously tend to express grandeur and force, whilst on the contrary one remarks, in the forms of larger plants particularly, a sort of indecision and weakness which could not furnish examples for monumental sculpture. Besides, who knows? These lay artists, who arose in France at the end of the twelfth century, and who raised themselves up in the midst of a badly constituted society, found perhaps a certain charm in enwrapping their art in mystery of the same kind that transmitted their grand principles to the shade of a sort of freemasonry. The first artists (we are speaking only of the lay school which arose from 1140-1180 in the Ile de France, and the neighbouring provinces), had devoted themselves to imitate the physiognomy of these modest field plants at the moment when they opened, when the leaves have scarcely sprung from their shoots or the buds appeared, when the thick stems, full of sap, have not attained their full growth, they had almost to seek as motives of ornaments the embryos, or even more, the pistils, the seeds, and almost the stamens of flowers. These were the elements with which they compose the lofty capitals which we admire around the choir of Notre Dame in Paris, in the church of St. Julien-le-Pauvre, in that of St. de Provins, at Sens, at Sens, at St. Leu d'Esserent, in the choir of Vézelay, in the church of Montreal, Notre Dame de Chalon-sur-Marne, around the sanctuary of St. Remi, of Rheims. Ere long they pass (for we know that these artists did not loiter on their way) to the imitation which develops itself. The stems grow longer and wither—the leaves open, the buds become flowers and fruit. Later on, these artists forget their humble primitive models; they go in search of their examples from the small shrubs; they select from the ivy, vine, holly, mallow, wild rose, and maple. At the close of the thirteenth century they begin to imitate servilely the oak, wild plum, fig, pear, as well as the leaves of the bindweed, parsley and herbaceous plants like the foliage of the principal trees of our forests. Everything to them is good—everything to them is a motive for ornamentation. Let us at once say that imitation approaches much nearer to reality as Gothic art tends towards its decadence. At the end of the twelfth century, and even to the beginning of the thirteenth, this imitation is submitted to monumental data, which lend to sculpture a particular beauty." "We may note that artists of the fourteenth century adapted the black hellebore (*Helleborus*), chrysanthemum, sage (*Grenadine*) strawberry, mallow (*Malva*), geraniums, ferns, large leaves such as the oak, maple, passion-flower, ivy, and vine. The sculptors of the fifteenth century adopted these that required more carving, such as the passion-flower, thistle, thorn, and mugwort (*Artemisia vulgaris*)." Amongst the illustrations of the above article, we noticed the following flowers were used in French sculpture. Birdfoot, trefoil (*Arum maculatum*), watercress, frogmouth (*antirrhinum*), liverwort (*Diclytra*), bryony, celandine, potentilla, plantain, birthwort (*Aristolochia*), violet sorrel, fig, and ferns.—C. F. W.

FONT.

The earliest font is supposed to be that in which Constantine is said to have been baptised—a porphyry labrum from a Roman bath. The Italian baptisteries were the first places used for immersion, and when the basilicas were converted to Christian use the baptistery was absorbed into them (instead of standing opposite the western entrance), and a font seems to have been placed within the western entrance from this time. Norman fonts are the earliest

in this country, and we may cite these in Winchester Cathedral and in the Church of St. Michael, Southampton, as two of the most ancient and interesting; they are of black marble, the bowl or basin being hollowed out of a square block, which is supported by a centre spiral shaft and four angle pillars. In both instances grotesque carving is found round the sides of the square top and on the top. By a constitution of Edmund Archbishop of Canterbury (A.D. 1236) fonts were required to be covered and locked, and the lids became at length very ornamental. The font is usually placed at the west entrance, either in the centre of nave or on one side. Sometimes a circular recess is built for it on the south side, or it occupies the tower. "J. A." cites fonts at Porchester Church, Lincoln, Lowestoft in Suffolk, Ludden in Norfolk, and East Dereham.

"E. W. P." mentions that a large one, of black marble, with twelve oxen rudely sculptured upon the outer face of upper portion of bowl, exists at St. Peter's Church, Ipswich. Another, of richly-carved Late Decorated character, adorned with representations of the Seven Sacraments, is to be seen in Rothwell Church, Northants.

"C. P. E." writes:—I omit all history of fonts, and merely call attention to a brass one in Munster Cathedral, described by Mr. G. E. Street and illustrated by him in the *Ecclesiologist*, Vol. XVI., 1855. It is supported upon five lions, two of which are standing, the others recumbent. The stem and bowl are circular, ornamented with tracery and mouldings; the bowl has five quatrefoiled circles, the eastern containing the baptism of our Lord, and the others the emblems of the Evangelists. Above them a trefoiled arcade contains half-figures of the twelve Apostles.

M. V. le-Duc, describing the fonts of the middle ages, says they are circular, square, lobed, or oval. They are ornamented with foliage, simple mouldings, figures, or geometrical designs, and are made of stone or marble lined with bronze or lead. The lids are generally of open woodwork, sometimes of open ironwork. Illustrations of the chief fonts are given in "The Architectural Antiquities of Oxford and Churches of Northamptonshire." There are casts of the following celebrated fonts in the South Kensington Museum:—Brass font in the Church of St. Bartholomew, Liege, made by Lambert Patras, 1112; 3 ft. diameter, and about 4 ft. high. Around the base are 10 cows' busts, the baptism of our Lord, the baptism of Cornelius by St. Peter, &c. Brass font in Hildesheim Cathedral; the basin is supported on four kneeling figures symbolical of the four rivers of Paradise—Geon, Phison, Tigris, and Euphrates. The ornament of the font is divided into four compartments—1. The Virgin enthroned. 2. Passage of the Red Sea. 3. Baptism of our Lord. 4. The ark being borne across the Jordan. Said to belong to the 10th century.—C. F. W.

Some of the plans submitted to the Town Council of Salisbury were last week severely criticised by that body. One of the councillors suggested that everybody appeared to be his own architect and draughtsman. Any one who saw the plans could hardly believe that there was a school of art in the city. The spelling was as bad as the designing. On a plan then before him "rope" was spelt "roap," "scullery" with a single "l," and "baroque" with but one "a." In some recent cases the plans submitted were so imperfect that members of the committee had to make personal visits to ascertain where the places were.

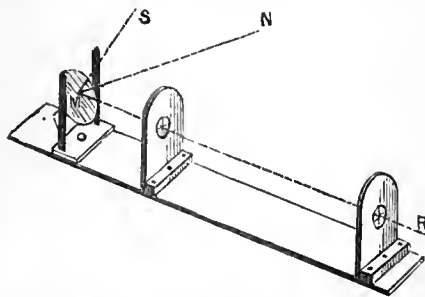
The Metropolitan Board of Works received at their meeting on Friday, two communications from the local authorities of Plumstead with reference to the disposal of sewage, and the all-god foul condition of the Thames. The district board of that parish wrote inquiring what step the Metropolitan Board propose to take in order to prevent the pollution of the river Thames by the sewage at present cast into it, and urging the necessity of adopting some system of deodorising the sewage and of utilising it in the cultivation of waste lands, and the vestry followed this up by a letter requesting information with regard to certain statements made at the Metropolitan Board on the subject of carrying the metropolitan sewage to the Maplin Sands, and the estimates for the work; and asking when the suggested scheme of utilisation and reclamation will be carried out. Both communications were referred without comment to the works committee, to be considered and reported upon.

THE USE OF THE HELIOTROPE IN GEODETIC SURVEYS.*

THE heliotrope is used to reflect the sun's rays to distant points, and thus facilitate the operation of reading angles, either horizontal or vertical, on lines of from 15 to 100 miles in length. The name is derived from *heli*, the sun, and *trope*, turning—hence the instrument is one which turns or deflects the rays in any required direction. It differs from the heliostat in not being automatic. Its construction is so simple that it may be made by any school-boy with a penknife. Two opaque screens are placed about 18 in. apart upon a strip of wood forming a base and screwed or nailed fast. A hole about 1 in. in diameter should be cut through each screen, the one in rear being a little larger than the other, and across each there should be drawn two fine wires or threads so as to intersect each other.

About 6 in. in rear of the screens there should be placed a small mirror—3 in. in diameter will be sufficient—so mounted as to have the two motions horizontal (or in azimuth) and vertical (or in altitude). The crude instrument is then ready for operation. To throw the ray upon any given object visible to the unaided eye, turn the mirror down out of the way or remove it altogether, and sight across the wires, moving the base until the line joining the intersections of the cross wires passes through the object. Then replace the mirror carefully so as not to disturb the line of sight, and turn it in either or both directions until the shadow of the edge of the hole in the first screen is concentric with that in the second. The reflected ray will then be visible to an observer at the given point. In the diagram S is sun, M mirror, S M incident ray, M N normal, and M R reflected ray.

When the observer is so distant that a telescope is necessary to determine the direction to him, the instrument is modified by attaching the rings and mirror to the telescope, care being taken that the axis of the rings is parallel to that of the instrument. Should the sun be in the plane of the mirror or back of it so that no reflection can be obtained, an auxiliary mirror must be used and placed in such a position as to reflect the ray upon the primary mirror which, by a second reflection, sends it through the rings.



Although so simple and inexpensive, this little instrument serves to increase greatly the economy and accuracy of reading angles to very distant objects. The rays reflected from it are plainly visible to the naked eye at from 30 to 50 miles, and with telescopes these "day stars" have been seen at a distance of nearly 100 miles across Lake Superior when no trace of land was visible.

It needs no second thought to perceive that they may be used as were the semaphores of Claude Chappé introduced in 1794 as the first efficient telegraph, but with greater effect. By adopting any convenient code of long and short flashes made by obscuring the ray, messages may be sent from point to point. In one instance a vessel was saved by signaling to a party at Marquette, Lake Superior, that she had grounded on some rocks near the station "Vulcan" on Keweenaw Point.

The Morse code is as convenient as any other, but for simplicity a conventional code expressing certain sentences by a few flashes is found to answer the ordinary requirements of field work.

The parish church of St. Mary, Thetford, Norfolk, was reopened on Friday, after the erection of a new roof. In the last Civil Wars the church was turned into a stable by the Parliamentarians, who pulled down the roof, but at the restoration it was replaced by the Corporation of Thetford, with the assistance of Thomas, Duke of Norfolk. It is this roof, which, having become insecure, has just been replaced. The new one is of pitch pine, with hammer-beam principals, resting on moulded stone corbels, with traceried spandrels and boarded ceilings, and is covered with slates and red ridging from Maidenhead. There are also new stone cornice, stone coping to chancel gable, &c. The work has been carried out from the designs of Mr. E. Beardman, of Norwich, at a cost of £470. Mr. S. Holden, of Thetford, was the builder. In the spring time the porch is to be restored by the same architect and contractor, at a cost of £85.

* By L. M. HAUPT, Professor of Civil Engineering, Towne Scientific School, in *Journal of Franklin Institute*.

Building Intelligence.

CORK CITY.—The Earl's or north transept of the new cathedral of St. Finn Barre has been enriched with several stained-glass windows, so that when the works in progress are completed there will remain but two plain windows in the transept—those in the ambulatory. The principal window is a rose, lately set up to the memory of Francis, third Earl of Bandon. This consists of eight compartments round a figure in an oval. The central light represents our Lord on a blue ground, seated on a rainbow in a silver halo; the other lights depict the different scenes from the scriptural narrative of the Resurrection, and treat the condition of the blessed and those who have not attained to so high a state of happiness hereafter. The four windows beneath will be appropriated:—No. 1 as a memorial to the late Earl of Carlisle; No. 2, by the Duke of Devonshire; No. 3, by Sir Arthur Guinness; and No. 4 to the memory of the late bishop, Dr. Gregg. In the ambulatory is the Countess of Bantry's window. The three lights represent "The Flight into Egypt," "The Slaughter of the Innocents," and "Jesus Discouraging with the Doctors in the Temple." Near by is another three-light window to the memory of the late Recorder of Cork. The subjects are:—"The Shepherds and Angels in the Field," "The Shepherds Worshipping the Holy Child," and "The Adoration of the Magi." In the north aisle are a series of windows filled with the following subjects:—"Abraham Entertaining the Angels," "Abraham about to Slay Isaac," "Moses and the Burning Bush," "Judgment of Solomon," and "Solomon Building the Temple." The choir wall has been presented by Mrs. Elizabeth Gregg. It is 4 ft. high, composed of white-veined marble, with three moulded panels, two containing foliage, and the central one a grotesque human head of alabaster on gold mosaic ground, set in frames of green Galway and red French marbles. The base and capping of the walls are moulded, and the cap is set with alternate slabs of red and green porphyry, between intermediate squares of lapis lazuli and bezants of gold mosaic. A border of gold mosaic is set round the entire of the cap. The inside of the wall facing the chancel is of the same marble, with square panels of red and green alternately. The choir gates, given by the Countess of Bantry, are 6 ft. 11 in. wide and 4 ft. high. They are of polished brass, and each gate contains nine panels; those in the centre are composed of quatrefoils and birds of paradise, the others of quatrefoils with tracery, foliage, scroll-work, and birds. The new lectern has been given by the women of Cork city and county, and has been wrought in brass, at a cost of £220, from the designs of Mr. W. Burges, the architect of the cathedral. It is 9 ft. 9 in. from the ground, and stands on a square pedestal, supported by four lions' paws resting on circular bases. The pedestal tapers from 2 ft. 1 in. to 1 ft. 5 in., and is 2 ft. 2 in. in height. Each of the four sides is decorated with Early English foliage, which springs out of animals' heads, in which five crystals are set. On the top of the pedestal is a circular base 4 in. in height, which supports the pillar, which is 2 ft. 2 in. high. In the centre of the pillar is an annulet set round with 16 crystals, and on the top a cap set with 48 crystals in double rows of triplets each. From this cap rises a triangular revolving desk. On one panel is a profile of Moses, on the other that of David, in alto relievo. On each side are elaborately-ornamented bracketed sconces, and on the top of the desk is a cresting of interlaced foliage. The leaves are surmounted at the apices by crystal globes.

NORTHAM parish church, East Sussex, has just undergone extensive internal restoration. The exterior had been previously restored and enlarged, and the spire rebuilt and raised 10 ft. from the designs of the late Mr. Sydney Smirke, R.A. The present works include the taking down of the galleries and the removal of the fine organ after alteration to the north chancel aisle. The flat ceiling of the nave has been cleared away, showing the old timbered roof. New roofs have been placed upon the north and south aisles, the plastering knocked off, and the walls stuccoed. The whitewash having

been cleansed from piers, arches, and windows, the masonry is seen to be from local quarries. The old square pews and nave and nave aisles have been replaced with open benches of pitch pine and oak. A glazed oak screen has been placed on the east side of the tower arch. The passages of the nave are repaved with tessellated, and those of chancel with encaustic tiles. During these operations a stoup was discovered close to the entrance to the south aisle, and also a piscina in good condition. At the east end of this aisle the windows have been restored and filled with cathedral glass, and a bed of concrete spread over the ground beneath the floor. A large vestry has been erected, and warming apparatus introduced into the church. The present work has been carried out at a cost of £1,100, from the designs of Mr. Albert Smith, architect, of Rye.

STAINED GLASS.

BROOMFIELD.—A stained glass window has been placed in the west end of the north aisle of Broomfield Church, near Chelmsford, as a gift by Mr. Clayton, of the firm of Clayton and Bell, in memory of the late vicar, the Rev. J. P. Smith. It is in three lights occupied respectively by the full-sized figures of Noah, Moses, and John the Baptist; the tracery above of decorated character contains some texts, and at the foot is a dedicatory inscription.

WATER SUPPLY AND SANITARY MATTERS.

ALFRETON.—Owing to pit workings in this neighbourhood the supply of water for some years has been growing deficient, and the Belper rural sanitary authority are taking steps to alleviate the water famine. Messrs. Coke and Mills, of Chesterfield, are the engineers, and they have decided to obtain water from Lindway-lane and Butterley, a distance of 5 miles from Alfreton, and so much above the town level that the water can be conveyed by gravitation. Two reservoirs are being constructed by Messrs. T. and F. Coulton, of Birmingham, one of which, at Lindway-lane, covers an area of 8 acres, and another still higher at Butterley, near Ashover, covers rather more than an acre. The contracts, which amount to upwards of £18,000, should have been completed by August, 1879, but owing to unforeseen difficulties having intervened it seems very improbable that the works will be finished by that time. Messrs. Oakes, of Riddings, supply the cast-iron pipes, and Mr. Thos. Cramp is the contractor for laying them down.

New Board schools were opened on Monday last, in the district of St. Augustine's, Norwich, to accommodate 1,250 children. They were built by Mr. Youngs, of Norwich, from designs by Mr. John H. Brown, architect to the board. No expense has been spared in building and fitting these schools with the newest and most approved appliances. This portion of the work was entrusted to Mr. G. E. Hawes, of Norwich, who has supplied all the fittings throughout. The boys' and girls' schools are supplied with his celebrated "locker deal desks."

The parish church of Hopton, West Suffolk, is about to be restored at a probable cost of £1,200.

On Tuesday week Mr. Loomes, builder, of Belper, the contractor for the erection of a new Wesleyan school-room in the Pottery, Belper, was assisting in putting a stone in position when the scaffolding gave way, and he fell, with the stone upon him, and was seriously injured.

The Queenstown Town Commissioners have received the sanction of the Public Works Loan Commissioners for loans of £1,300 for making an approach to boat harbour, making hydrants, flagging streets, and making boundary road walls, and £100 for sanitary purposes.

The twentieth annual dinner of the Nottingham Operative Painters' Society was held on Saturday evening, at the Punch Bowl Inn, in that town, Mr. Southgate in the chair.

The De Lank Quarries Company, near Bodmin, have received an order from the Trinity House Commissioners for £20,000 worth of granite, for the construction of the new Etdystone Lighthouse, and a tramway four miles in length is to be made to Bodmin-road station to ship the same. The granite used in the new General Post-office and for the Victoria Embankment quay wall also came from the De Lank quarries.

At the Norfolk Quarter Sessions, last week, it was reported that extensive additions were being made to the county pauper lunatic asylum from the designs of the county surveyor—Messrs. Cornish and Gaymer, of North Walsham, being the contractors. £13,000 has been expended on the work, and £9,000 more was asked for (and voted) to complete the work.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the **ENGLISH MECHANIC AND WORLD OF SCIENCE**, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation renders it the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price Two-pence, of all booksellers and news-vendors. Post-free 2½d. Office: 31, Tavistock-street, Covent-garden, W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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"BUILDING NEWS" DESIGNING CLUB.

SERIO MELIORA. (You say we have not understood the meaning of your drawings. If the corbel in detail was a stone one so much the worse, as our remark in that case applies with greater force. What we criticised was the extraordinary profile.)—A. BANKS. (The rules are not published separately, but the number may be had on enclosing stamps.)

OUR COMMONPLACE COLUMN.

NOTES or quotations upon subjects under the heads of French casement, gable, Galilee, gallery, gate, gauge, gauged arch, geometric proportion, Geometric Decorated, gilding, girder, glass, Gothic, granary, granite, Greco-Roman, greenhouse, &c., will be received up to Tuesday, the 21st inst.

Correspondence.

BELHAVEN CHURCH, GLASGOW.

To the Editor of the BUILDING NEWS.

SIR,—There can be no doubt that the designer of the above church is a great admirer of the works of Mr. Norman Shaw; and that there is a great similarity between Belhaven Church and the English church at Lyons a glance at the lithographs, as your correspondent has pointed out, will show. This I had previously noticed on seeing the drawing in the Academy last year.

But are Messrs. Campbell Douglass and Sellars to blame for making their church so close a reproduction of one of the best works of one of our most celebrated architects? We all like originality in architecture when it produces a beautiful design and a building that it is a joy to look upon, as evinced in so many instances in Mr. Shaw's work; but where that originality in design is lacking, I think, as our architectural friends from the North appear to have done, that it is better to perpetuate a good thing than perpetrate a bad one. And I say this not in disparagement of Messrs. Campbell Douglass and Sellars, for I have no doubt that Mr. Shaw has in his time been indebted to old work for ideas and for the contour of his mouldings, not fearing to reproduce them in his new work because they were copies of the work of our glorious old monk architects.

Your correspondent, "Wykeham" seems by his taking this matter up, to infer that architectural plagiarism is something new, and, moreover, a very heinous offence; but where is the architect amongst our teeming thousands who, when the question is asked, "Didst thou do it?" can stand forward and unblushingly say "Not guilty?"—I am, &c.,

HENRY HOPTON.

THE BALLOT AT THE A.A.

SIR,—I objected to the ballot for the reasons stated in my letter of 27th December, and I do not admit Mr. Scott's conclusion that the general objections to the ballot are exploded. I esteem it an honourable distinction to belong to the minority who condemn it.

I have not disputed the right of rejecting candidates for election. I agree with Mr. Scott that the reference of the name of an applicant to the committee should insure such inquiry that there should be no question of his fitness, but I am not of opinion that our delegation of such power to our committee should do away with the ultimate appeal to the whole body of members. Our franchise applies to more than election of members, and is a right which we should guard. As to whether "a pupil who has been only a month in an architect's office" is competent to decide upon the merits of a candidate, I believe that the intelligence of the class from which our pupils are drawn is beyond the average, and I think he is as capable under such simple circumstances as the older members. In the case of any candidate the persons who have special knowledge of him are few. The election simply gives them an opportunity of expressing their dissent, and theirs are the only votes of any special value; the others are the result of confidence in the committee or otherwise. If the conditions of membership become more clearly defined, and the committee are careful in their inquiries, we shall hear no more of the election of unfit persons.

Mr. Scott tells us that the junior members obtain the largest share of the advantages of the association, and so they should. The association was instituted for the pupils and obscure men, not for "the practitioners of 40 years' standing." I believe that the senior men who have done so much for the association are contented with the approval of their own consciences and the satisfaction of leaving the profession better than they found it.

If the line of separation between the pupils and the 40 years men does exist, the sooner it disappears the better for every one concerned. We all admit that the general status of the profession requires to be raised. The association should be a powerful element in this work, but any result worth the having will only be brought about by the co-operation on equal terms of the whole body of the members. Our like profession should be a warrant of equality. If the members of the association tolerate the institution of a superior order and the deprivation of their right of voting, they are a much more spiritless body than I have supposed.—I am, &c., JOHN LEANING.

SURVEYORS' FEES—QUALIFIED SURVEYORS v. QUACK MEASURERS.

SIR,—Having had nearly forty years' experience as a contractor for works in various parts of England and Wales, I have been much interested and amused by the varied experiences of your correspondents during the last few weeks. There is, in my opinion, much to add to what has been already stated, and in justice to the bona-fide and duly qualified quantity surveyors, all the odium attached to the subject should be removed from their shoulders and placed to the credit, or rather discredit, of the wretched quacks (and their name is legion) who palm themselves off upon architects, builders, and the public as surveyors, when utterly incapable of performing the duties they undertake.

In my experience the overcharges, tricks, and errors of which builders and others justly complain are the work of the impostors I allude to, while such men as Rickman, Poland, Gardner, Son, and Theobald, and numerous others in London, and a few in the provinces, are incapable of the errors and charges of such

men as I refer to, their work being at the same time thoroughly well done to the satisfaction of all parties concerned in contracts.

The delinquencies of unqualified surveyors have not been fully stated by any of your correspondents. I can, from my own experience, give numerous cases in which great frauds have been committed, while the helpless client is kept in ignorance of the facts by clever manipulation of the accounts to "blind" him, and the contractor is made the medium or instrument of such architects and surveyors in abstracting from the client's pocket large sums of money to transfer it to the architect's pocket in the name of fees. To illustrate this part of the subject I give a few cases within my own knowledge:—

1st. An architect undertook to build two houses exactly alike for £2,500 or £1,250 each. In due course tenders were obtained, based upon the architect's own quantities of one building only, for which he charged 2½ per cent., with the addition of £23 for copying (four copies), at the same time instructing the builder to double the amount of his priced estimate as a tender for two buildings. The lowest tender amounted to £3,800 instead of £2,500, the charge for quantities being £140. The client thereupon refused to build unless the tender could be reduced to £2,800. Subsequently the architect submitted to the builder an offer of the reduced amount for an amended design without taking quantities, but to include the fee of £140. The work proceeded, during which trifling changes were made, involving extras of about £200, but the architect, instead of measuring the extra work, which could easily be done, made a bill of extras and deductions of a very large sum, added the two together, charging 2½ per cent. again on the result. The most barefaced wrong of all was the fees charged on what are termed provisions, which for grates, &c., were put down at about £300. 2½ per cent. was charged in original quantities, and again on both sides, extras and deductions, amounting to 7½ per cent. in an item that involved no measuring, designing, or selection, the client having purchased the goods himself. The "copies" of quantities were charged £46, whereas they would have been amply paid for at £1, being written at one operation on tissue paper through carbonic sheets.

2nd case. A client requiring additions to a house consults his architect, expressing his intention to spend about £4,000 on this basis; his architect prepares plans and issues his own quantities, and the lowest tender amounts to about £10,000. 2 per cent. and a fee for copies is charged on the £10,000, and the usual process of reduction takes place in order to induce the client to build; quantities are again taken out, and another commission charged, the tender being £5,000, for which sum a contract is made, the architect being paid nearly £300 for quantities on £5,000 contract. In this case a large sum is put down for provision for contingencies, on which the architect charges measuring commission four times—viz., 2 per cent. originally, 1 per cent. on second tender, and he includes the item on both sides, extras and deductions, charging commission again and again.

In the latter contract the architect proved to be utterly incompetent either to take off quantities or measure work when done.

I can give scores of similar cases in which builders are to a certain extent involved, but for reasons you can understand are powerless as individuals to reform such transactions. I would suggest and urge upon the leading associations of both architects and builders to take this matter up and devise some means of supporting and encouraging only such surveyors who are properly educated to the work, and ousting from practice all such impostors who, without the necessary knowledge and experience, foist themselves upon the public as surveyors.

My experience leads me to the conclusion that properly qualified surveyors cannot afford to risk their reputation by resorting to such practices as I allude to, but that ignorant inexperienced men snatch every opportunity that offers to swell a precarious income, trusting to the secrecy that builders are bound to observe assisting them to extract unearned money from their clients' pockets.—I am, &c.,

AN OLD BUILDER.

Intercommunication.

QUESTIONS

[5629].—**Fir.**—How can one distinguish between Swedish and Memel or Riga fir, when cut into scantlings? An answer will oblige.—H. W.

[5630].—**Inscription.**—Would some kind reader furnish me with the meaning of the following sentence which I find engraved at the bottom of several monumental brasses—"Cujus A'is p'picietur dens?" Another form thus—"Cuj aie p'p'iet' de'."—A. B.

[5631].—**Sketching.**—I purpose devoting four or five weeks next summer to sketching mediæval work in some one English county—I am indifferent which. Will some one kindly advise me which to select—as presenting the most fruitful field of study?—J. W. W.

[5632].—**Right of Access.**—A piece of land has been left to me and a few relatives, to be divided amongst us, which, if divided as set forth in the will, leaves me with a piece of land without any way of getting to it from a public thoroughfare, as it is behind other property. Will some of your readers kindly favour me with their opinion as to what course I am to take in order to get access to it, and oblige—A CONSTANT READER?

[5633].—**Roof-Tiling.**—Would some reader kindly say what is a fair price per square yard for flat red Staffordshire roof tiling in Yorkshire, including both material and labour, and also what is the best way of fixing tiles?—C. S. M.

[5634].—**Strength of Roof Materials.**—I wish to calculate for and find out the strengths of rafters and struts for iron roofs, but am at a loss with the rules I have, which are from Spon's and Hurst's tables. I can find out what weights they will have to sustain by the triangle of forces, but not the sections of metal to sustain these weights. If some reader will mention some works treating on the subject—not algebraically—or give some information through the medium of your paper, I shall be obliged greatly.—AMATEUR.

REPLIES.

[5624].—**Tiled Roof.**—The lap is always considered to be from the pin or nail hole to the outer lower edge of the "overlapping" tile or slate.—B.

[5625].—**Rendering Wood Incombustible.**—One means of rendering wood unflammable is by steeping in or washing it with alum water. This should be frequently repeated. There are other processes, but this is the cheapest. Of course this does not render wood incombustible, and I am not aware of any process that does.—G. H.

[5626].—**Hollow Walls.**—My experience is that it is best to place the 9in. inside to carry the weight of floors and roof, and to build the 4½in. all stretcher bricks, bonded with iron ties forked at each end, and with a twist in the centre to prevent the water drifting. These should be made hot and dipped in gas tar. Timber framing should be grooved on the edges next the bricks, say, 1½in. wide and 1in. deep (vertical timbers only), and if cemented a taper groove in addition for the cement, which should be flush with timbers.—JAMES THORNELOE.

[5626].—**Hollow Walls.**—I have generally placed the 9in. wall on the outside, as it forms better reveals for the openings, the 4½in. answering very well on the inside and for taking the bond timber and joists. I should certainly advise "W. R." not to trust in the tile hanging outside a half brick wall to keep it dry. There should be a hollow space and inside battening. Cement and plastering may do a great deal but they will not keep a 4½ solid wall dry under ordinary precautions. "W. R." will find in a recent

volume of BUILDING NEWS a section of a half-timbered wall.—G. H. G.

[5627].—**Fir Timber.**—The term "fir" is rather a general term used to mean Baltic timber. It is certainly vaguely applied, and may mean spruce as well, but used in the sense referred to after the specification of Baltic red wood, it can only apply to that kind of fir timber.—AN ARCHITECT.

[5627].—**Fir Timber.**—The term "fir" in bill of quantities is not to be literally taken as understood in the timber trade, to which your correspondent appeals. It is a general term for fir, deal, or pine, and the like. Similarly, it is common to talk of deal boards, deal doors, and wrought deal for wood that is not deal. Fir framed in roofs, rough fir in lintels, fir in joists, &c., would include Baltic or other pine or fir, for which the specification must be referred to and followed. The definition may be somewhat loose, but it is well understood technically by all builders and surveyors. It would be the veriest quibble to treat the term apparently in its narrow sense so as to make it include the cheap rubbish answering to the name.—B.

CHIPS.

The drinking fountain erected in memory of the late Mr. Samuel Turner, at Buxton, was unveiled on Wednesday week. The work of erection and carving was carried out by Mr. Ash, monumental sculptor, of Buxton.

A new stry factory, built for Messrs. Footman and Co., in Tavern-street, Stowmarket, was opened a fortnight since. Messrs. Andrews and Son, of Stowmarket, were the builders.

An experiment in providing improved dwellings for the very poor has been made at Launceston with success by Colonel Deakin. Two blocks of eight cottages each, of stone, with slated roofs, have been erected on the Launceston-road. Each cottage contains four rooms—two on ground floor and two above—with lean-to at rear and a small garden, and lets at £4 per year. It is said that at this moderate rental they will yield 5 per cent. on the outlay. Mr. Thomas Longman was the builder.

Extensive repairs are being made to Cattawade-bridge, over the Stour, connecting Suffolk and Essex at Manningtree, under the superintendence of Mr. H. M. Eyton, county surveyor for Suffolk.

The Leeds Town Council have raised the salary of their gas engineer, Mr. Woodhall, from £500 to £650 a year.

The Dover Town Council and Harbour Board have completed a scheme of sea defences at East-cliff, and on a portion of the Esplanade, under a local Act of Parliament. The contract was carried out by Mr. Josiah Hall, of Queenborough, at a cost of £9,500, and under the supervision of the borough surveyor.

The town council of Preston have accepted the tender of Messrs. W. Allsup and Sons for the supply of ironworks, &c., for additional cattle pens and gates at the cattle market.

It was reported to the Bathual-green guardians on the 31st ult. that the works at the well on the workhouse premises had been stopped by the contractors (Messrs. Doe and Co.), as in their judgment the object desired had been accomplished. The boring had been carried to a depth of 30ft. from the surface, and a supply of water had been obtained which seemed practically inexhaustible. Satisfaction was expressed at these statements, and pumps and other fittings were ordered to be erected forthwith.

Our Office Table.

A WELL-KNOWN architect, one of whose buildings was illustrated in our Christmas double number has, to his surprise, received from some outsider an offer of fifty copies of the drawing. We have made inquiries, but cannot find the individual from whom the offer emanated. Unless the copies referred to were bought in the ordinary way with copies of the paper from our publishing office they must either have been surreptitiously obtained or reproduced—probably in some inferior manner—without our authority, and at the risk of legal proceedings which we should of course be compelled to take against any one infringing the copyright of the authors of drawings reproduced by us, or of our right of illustration. Architects and others will therefore do well in any similar case to refuse to entertain any similar proposals, and to inform us at once if any such offers are made to them.

The following schedule of prices for well-sinking in clay, lined with 9in. brickwork in Portland cement, are given in the revised "Local Board Suggestions," and may be found of service:—

Wells of 4ft. diam. to depth of 200ft.,	50s. per ft. run.
" 5ft. " " " "	65s. " "
" 6ft. " " " "	85s. " "
" 7ft. " " " "	105s. " "

In chalk the prices without brickwork and pumping are, for—

Wells of 4ft. diam. to depth of 200ft.,	18s. per foot.
" 5ft. " " " "	24s. 6d. per foot.
" 6ft. " " " "	27s. 6d. " "
" 7ft. " " " "	35s. " "

Of course, the above prices will vary according to district and other circumstances.

MANY schemes have been propounded for uniting the Cheshire and Lancashire sides of the river Mersey, but up to the present they have all failed. Another scheme is about to be laid before the public, and from the approval which it met at the hands of many of the leading merchants, shipowners, and others, at a private meeting held in Liverpool on Monday, there appears to be some prospect that it will be launched under favourable auspices. Mr. C. G. Mott is the originator, and from his explanation, it appears that it is proposed not to have a railway tunnel, but one for pedestrians and vehicular traffic. As the gradients required for this tunnel can be made much more steep than for a railway tunnel, it will be unnecessary to carry the approaches so far into either Liverpool or Birkenhead as it would be in the other case. The proposed works would commence opposite the open space in front of St. Nicholas's Church, then make a detour to the left, and pass underneath the Chester Wharf, and the entrance to the Manchester Dock. It will then cross underneath the river, come out near to the Morpeth Branch Dock, and be brought into direct communication with Argyle-street, Birkenhead. The tunnel is to

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be a double one, with two arches, each arch having a footpath for pedestrians, a tramway road, and two lines for carriage and cart traffic, making in all three lines of road in each direction, in addition to the accommodation for foot passengers. As the bottom of the river is composed of solid sandstone rock, no engineering difficulties are likely to be encountered, and there will, it is expected, be little trouble in keeping the place free from water. The total length of the roadways will be one mile and a third, and the entire cost is estimated at £300,000 to £400,000.

MR. WHISTLER, having failed to get satisfaction out of Mr. Ruskin in the law courts, has published a pamphlet, which he dedicates to Mr. Albert Moore. He declares that the war, of which the opening skirmish was fought at Westminster, is really one between the brush and the pen, and he refuses to acknowledge Mr. Ruskin as a competent critic. Mr. Whistler is not content with merely flagellating Mr. Ruskin. He attacks all art critics, and maintains that they should be extinguished, and that they have no right to carry their praise or censure into the domain of art. Whatever may be said of his painting Mr. Whistler proves that it must be better than his writing, and that both are better than his taste. Thus, he writes of Mr. Ruskin, in his capacity of Slade Professor, as "whining for pupils." Again, writing of the author of "Modern Painters," and with an obvious reference to that work, he says, "Let Mr. Ruskin resign his present professorship to fill the chair of ethics at the University. A master of English literature, he has a right to his laurels, while as the populariser of pictures he remains the Peter Parley of painting."

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. Discussion on "Buildings in Midland." and Paper by Thos. Verity, on the "Modern Restaurant;" 8 p.m.
WEDNESDAY.—Society of Arts. Paper by T. A. Brockelbank, on "Economy and Safety, by the Use of Automatic Couplings on Railways;" 8 p.m.
" British Archaeological Association. Papers by Thos. Morgan, F.S.A., on "The Roman Army in North Britain, with Reference to Recent Discoveries;" by C. Roach Smith, F.S.A., on "Roman Fleete Statuettes from the Allier;" and W. C. Little, on "The Roman Road between Denver and Peterborough;" 8 p.m.
THURSDAY.—Civil and Mechanical Engineers' Society. Paper by W. C. Street, A.I.C.E., "Steam Laundry, Buildings, and Machinery;" 8.30 p.m.
FRIDAY.—Architectural Association. Thos. Blashill, on "Party Walls—the Law and the Practice;" 7.30 p.m.

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Trade News.

WAGES MOVEMENT.

LEEDS.—The Leeds Master Builders' Association has given notice to the operatives in the various branches of the building trade in Leeds and district for a revision of the present wages and working rules, the main features of which are contained in the following memoranda:—Masons: Notice given October 21, 1878, to expire 1st May, 1879. The present rate of wages is—setters of stone, 9½d. per hour, to be reduced to 9d. per hour; the present rate for masons is 9d. per hour, to be reduced to 8½d. That walking time, lodgings, and railway fares be matters for arrangement between employers and operatives. The masons now commence work on Monday morning at 8.30 o'clock. It is proposed that they shall commence at seven o'clock, the same as the other branches, and that on Saturdays, instead of giving up work at 12 o'clock noon, they shall work until 12.30. Bricklayers: Notice given to bricklayers October 21, 1878, to expire 1st May, 1879. That the question of walking time, lodgings, and railway fares be matters for arrangement between employers and operatives. Labourers: Notice given October 28, 1878, to expire 1st May, 1879. There is no existing code of rules for labourers. They are receiving 6d. per hour at present, and work 50 hours per week. It is proposed that they should be reduced to 5½d. per hour. Joiners: Notice given December 27, 1878, to expire 1st July, 1879. Joiners' present rate of wages is 8d. per hour; to be reduced to 7½d. per hour. That the question of walking time, lodgings, and railway fares be matters for arrangement between employers and operatives.

MONTROSE.—After a strike of six weeks' duration, the masons in Montrose have accepted the masters' terms—viz., 6d. per hour for shed work, and 6½d. for work not under cover, the three months' notice on either side being abandoned.

SHEFFIELD.—The master builders of Sheffield held a meeting on Thursday night to discuss the position taken up by the masons. It was unanimously decided that the masters should stand by their original decision—in other words, that they should not give five months' notice of their intention to reduce the wages of the masons. It was emphatically denied that any rule existed by which they were compelled to give five months' notice, it being stated that they had not signed any rules since the last strike, and that a rule requiring five months' notice was therefore not in existence. It was further stated that the masters had given the joiners six months' notice of a reduction, because they had signed the rules of the Joiners' Association, which required that such notice should be given.

WESTON-SUPER-MARE.—The carpenters' strike in this town was brought to a close on Wednesday week, when the men gave way, and agreed to go in on the terms of the masters, whose sole object has been to secure uniformity in the working hours of the several branches of the building trade. Work has been by no means brisk in Weston, and many of those who had been receiving strike pay have found their places occupied by strangers.

YORK.—At a meeting of the operative bricklayers of York, held on Saturday night, it was resolved to accede to the masters' proposal of a reduction of ¼d. per hour.

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TENDERS.

BIRMINGHAM (OLTON).—For a villa, including greenhouse, &c. Mr. Ewen Harper, architect, 27, Bennets'-hill, Birmingham:—

Lidzy	...	...	...	£1,261
Briley	...	...	...	1,240
Lee	...	...	...	1,147
Mills & Son	...	...	...	1,177
Dowse	...	...	...	1,135
Freeman	...	...	...	1,110
Wheeler	...	...	...	960

BOURNEMOUTH.—For a spire to the parish church of St. Peter, Bournemouth. Mr. G. E. Street, R.A., architect:—

Stephens & Barton, Bristol	...	£2,999
Dove Brothers, Islington	...	2,967
Adamson & Sons, Putney	...	2,965
Clarke, S., Bournemouth	...	2,946
Wall & Hooke, Brimscombe, Glo's.	...	
(accepted)	...	2,560
Pearce, Jas., Eastbourne	...	2,051

BRAY, CO. WICKLOW.—For the formation of a drain from Christchurch-terrace to the Bray main street for the Bray Town Commissioners. Mr. Brett, C.E., engineer:—

Brady, B. (accepted)	...	£557
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[Lowest of four tenders received.]

DURHAM.—For the erection of a new central police-station for the county of Durham, at Durham. Mr. William Crozier, M.I.C.E., architect; Mr. James Greenwood, quantity surveyor:—

Caldclough, Durham	...	£3,519 0 0
Lowes, Durham	...	9,450 13 9
Gowens, Hebburn	...	9,272 9 9
Forster, Croxdale	...	9,037 3 6
Robson & Son, Durham	...	8,997 0 0
Kennedy & Son, Jarrow	...	8,985 7 7
Inglis & Reah, Middlesbro'	...	8,958 0 0
Whaley, Durham	...	8,871 9 4
Middlemiss Bros., Corbridge	...	8,852 8 0
Forster, Washington	...	8,603 19 3
Grant, Durham	...	8,509 0 0
Allison, Whitburn	...	8,450 0 0
Harst & White, Langley Moor	...	8,440 0 0
Graden & Son, Durham	...	8,440 0 0
Sanderson, Durham	...	8,350 0 0
Robson & Tremble, Hetton	...	8,342 18 9
Atkinson, Stockton	...	8,262 4 4
Elliott, North Shields	...	8,190 0 0
W. & J. Rutter, Durham	...	8,169 0 0
Johnson, Hartlepool	...	8,040 11 4
Richardson & Co., S. Shields	...	7,798 12 4

* Withdrawn.

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THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 17, 1878.

DISCOVERIES IN CYPRUS AND ASIA MINOR.

THE world of art and archaeological discovery promises to be opened up in Cyprus and Asia Minor consequently upon recent events. In the island researches have already been commenced for the twin of that famous Phœnician idol in the Louvre, at Paris, wearing a crown of gold, ornamented with flowers and stars, with a collar on her neck, and her hands in the attitude of the Medicean Venus. So far, however, the new researches have gathered no fruit; and it is among the architectural remains of the region now given up to English protection, with the illustrations of artistic and domestic economy belonging to them, that the richest treasures are hoped for. These have been undertaken, indeed, by many of the same hands which produced the admirable restorations of the Roman and Augustan temples, and those in Arcyra and Galicia. We have thus found ourselves the heirs—or, rather, perhaps, trustees—of a prodigious antiquarian inheritance, which we shall have to guard against desecration and despoilment, together with rock and tablet inscriptions of Scriptural import, the transcripts of which have yet to be given to the world. These, we are told, reach to lower depths by far than those of authentically recorded history—beyond the apocryphal sandals of the Thothmes, and further even than the decorations on the undated tomb of Rehhamah, to which, nevertheless, an epoch must be assigned. The archaeologists at present at work, however, while searching for the traces of cities, temples, and other edifices, have been content, of course, with such as they are discovering upon or near the surface—slabs of stone engraving, with designs of heavy-wheeled chariots, drawn whether by oxen or horses, such as are described in the Trojan epic—shields and circular buckles, and short double-edged swords. Where these are found—and they are being found in rapid succession just now—it is evident, at least, that battles were fought, and battles in those ages were generally fought in the vicinity of populous places. Without troubling themselves upon these points, however, the latest excavators of Cyprus and of—as it were—Europeanised Asia Minor content themselves with chronicling the earlier results of their researches. It is thought that by means of these, and the results which will probably be gathered after them, a clear affinity may be traced between, for example, the relics dug up in the Etrurian necropolis of Vulci, and a large class of the Ninevite remains, between the Etruscan vase and the Assyrian or Babylonian cylinder. Should this be done the key to a great mystery will have been turned, and the traditions of the potters and painters belonging to the times of Candulus and Croesus be traced, both forwards and backwards, at once to their origins and to their influences. Even now some objects of Assyrian manufacture have been unearthed, bearing a wonderful resemblance to the gold cups disintombed from the sepulchres of Ceri, with bases characterised by every attribute hitherto assumed to be essentially and uniquely Greek. Should the process go on, with like results—for up to now our archaeologists have been only scratching the surface—a new point of departure, almost, will have to be, upon these lines of inquiry, fixed. The whole subject, however, is of interest, and especially to those who have confined their speculations, for the most part, within the limits of the Layard inves-

tigations. Even our sappers and miners, turning up the soil for the sites of encampments and barracks in Cyprus, hit upon winged figures, bull-shaped forms with humanised faces, griffins, and creatures with fish or reptile tails—imported from the mainland, no doubt, yet none the less suggestive of curiosity on that account. We have, in fact, in this part of the East stumbled among the materials of a perfectly new museum. Together with these have been “finds” of ironwork, gold, ivory, and glass, to which as yet no positive period of manufacture can be attributed. They are distinguished, says the correspondent of a French academical journal, by the fact of their possessing no typical, or, at any rate, known characteristics whatever. But, at a first glance, the fresh discoveries reported from Cyprus, and from Larnaca, the ancient Kittium, in particular, may be described as of supreme interest. They consist, for the most part, of gold, silver, and bronze cups, similar in design and craftsmanship to some which have been for many years exhibited in the archaeological galleries of the Louvre, in Paris. In addition, however, to the vases in metal, are those in painted earth, having a strong resemblance to others brought from Italy, and from the Valley of the Tigris as well, without any historical relation having ever been critically established between the two artist races. They are precisely the same as those which adorned the tombs of Asiatic kings and the temples of Greek Pagans. But they are more than this. The fragments disintombed, as it were, yesterday, correspond in all essentials with that celebrated pottery of the Cyclades which commanded the art-markets of Europe down to the twelfth and thirteenth centuries of the Christian era, and which had no other decorations than triple-coloured stripes, plain zones, zigzags, and circles, with a bistre tint, on a grey or yellow ground. These were varied occasionally by conventional roseate forms, figures of plants and flowers, animals arranged in long processions, monsters—half-human and half-bestial—sphinxes, syrens, and the subjects of an uninterpreted mythology. The similitudes of these, be it remembered, are now found, as they were found at former dates, not merely in the Isle of Cyprus itself, but also in the almost continuous region of Asia Minor. They include, moreover, representations of tapestry and other woven work, with apparently Oriental borders, the origin of which must remain a perplexity to all except the most courageous antiquarians. Still, the Cyprian vases would appear to possess a distinctive character in so far that, while decorated, in common with others, with girdles of engraved figures, frieze-like in their arrangement—to employ the term not in an architectural sense—the engraving is rarely in relief, while the modes of composition—and this completely accords with what we are told by Chandler, Clarke, and the rest of the older travellers—has a peculiarity of its own, which we see reproduced, not alone among the prehistoric ruins of Sicily, but also in European work bearing certainly no older date than that of the seventh or sixth centuries. In the paintings, too, as in the bas-reliefs, vestiges of a kindred art are visible, as, for instance, when the human figure is introduced, the anatomy, the muscular display, the attitude, the eyes, the movement, so to speak. They all tell of an Assyrian origin, upon which another originality, very unlike the Assyrian, has been engrafted. So far with regard to the better class of relics, which the most modern of archaeologists are busily engaged, in both Cyprus and under the English protectorate in Asia Minor, in bringing to light. Naturally, they anticipate making no such rapid progress with their architectural researches. Even in this direction, however, the promises of

new discoveries, or enlargements on a grand scale of old discoveries, are already announced. They correspond with much that had already been established with respect to these monuments of archaic art, belonging, for the most part, to the ante-Grecian epoch, though, in a great degree, the native art of Asia Minor may be said to represent no style at all. It may be said to have been, from Lydia to Cappadocia, mere rude sculpture in the rock, largely made up of animal forms, rather Babylonish in its outward features, and suggestive of questions appertaining rather to ethnology than to art. The excavations now laying bare below the lines at which the monuments were formerly supposed to cease, the Nymphian bas-relief, near Smyrna, the Giaour-Khabri, in Phrygia, the Lion of Kalaba, and the gates of Mycenæ, all point, though from different periods, to the same history. There is thus a mingling of many ages among these treasures, which French explorers are ransacking, while English administrators are taking over the guardianship of the country above the surface. Among their latest discoveries may be enumerated some fragments of walls lined along the summit with plates of polished metal, resembling those identified in the now famous “Treasury of Atreus,” at Mycenæ, which plates were attached to the masonry by means of nails; bits of a frieze ornamented with bronze leaves, also nailed on to the foundation; the ruins of a timber roof, which, apparently, had been subjected to some powerful preservative process, and which, it would seem, had served as the covering for a house constructed altogether of wood; and slabs, evidently of pavements, painted with the figures—symbolically conceived—of lions as guardians. This was, to judge from the remains unearthed, a common ornament of doorways of both tombs and houses, and is to be found alike in front of the gate of the mausoleum assigned by tradition to Midas, and in that of a cottage door in nineteenth-century Cyprus. An even more interesting discovery, however—led up to, no doubt, by others—has been made, and this is the very common character of those “chimney” funeral chambers once supposed to be so rare. They are believed to be of Phrygian origin, but their remains are at present to be found, though not in very great abundance, all the region over, insular not less than continental. By the peasantry they are to this day called “stone-piercers,” or, literally, “holes in the wall;” but they were, strictly speaking, funnels excavated from below to above in the rock. A sham door was first carved on the front surface of the solid stone, above it was hollowed a niche, which, when occupied by a dead body, was closed with an upright slab; and so, upwards and upwards, until the summit was nearly reached. Little art was wasted upon these Orientally Gothic sepulchres, though they are not all invariably alike. The latest archaeologist in this field found, in fact, at Kambet no sham door, no pretence of a “chimney” carried up through the entire mass of the mountain; only a deep mortuary cave, embellished with brilliant colours, and characterised by certain adornments, reminding him slightly of the Mausoleum at Halicarnassus. It is often confessed, however, by the most intrepid of these archaeological inquirers, that it is difficult to distinguish between the various characters and purposes of the innumerable monuments that travellers of late have recommenced describing and cataloguing. Thus, the colossal image on Mount Sipylus, between Magnesia and Smyrna, is set down as Niobe, though it gives no other idea than that of a gigantic female figure, seated. M. Soiry, the latest explorer, thinks it represents “the Mother of the Gods,” whose

worship is known to have flourished in that neighbourhood, and in the parts round about. But, singularly enough, there exists the fragment of an almost undeniable Niobe, crouched in a crevice of the rock, whence a fountain of water has flowed from immemorial time. But it is by far too early for even the most enthusiastic of modern explorers to have corrected, in these respects, the opinions of those who went before them, and whose labours were so long interrupted by the impossibility of pursuing them amid incessant wars and rumours of war. Allowance has to be made, moreover, for the barbarism in the keeping of which these monuments and their incidental relics have so long remained. Thus, an edifice called by the Turks in Cyprus, "the fortress of the Infidels," was, in fact, a shrine constructed in the rock of indefinite antiquity and marvellous sculpture, dating from an epoch in which the Turks did not so much as possess a name. The arms advanced, the broken bow and arrows, the girdled tunics, the bare limbs, the sandaled feet, the tiara-crowned head, the serpent ornament, the one bearded and the other beardless, all belong to some heroic period of art, to an age invisible, but which the Ottomans, not being artists in the highest sense of the term, found no difficulty in ascribing to some unbelieving builder of modern fortifications. Not far from this, recent discovery has alighted upon that which is believed to have been the Palace of a Cappadocian dynasty, though the theory is altogether conjectural. Certain it is, however, that the edifice is composed of enormous blocks of stone up to a certain height, whence the walls were carried up in brickwork, not dissimilar to that employed in the most antique structures of Nineveh. The outlines, too, have been more or less distinctly traced, including a Hall of the Throne, with galleries, whereon faint signs of the painter's handicraft are still to be detected, and what, at any rate, is assumed to have been the peculiar abode of the women and children. That which appears to have been a throne, guarded by two lions, lies overturned in the dust. Many other investigations similar to these are in course of being undertaken, on the assumption that the archaeologists, of whatever nationality, will not be disturbed at their labours; and it is anticipated that numerous processes of discovery, interrupted during a hundred years past, will be resumed, with a rich reward to the present generation; but the most immediate curiosity attaches, perhaps, to the results of the antiquarian work which has been begun in Cyprus.

LAMBETH INDUSTRIAL PAUPER SCHOOLS.

WE have not been able to get a view of the unpromised drawings sent in for the proposed Norwood Industrial Pauper Schools, notwithstanding we have made two or three applications; and the Board are apparently acting on the policy of keeping the ratepayers and the competitors in the dark. At a special meeting of the Lambeth Guardians held last Monday, the selection of three designs was confirmed. We will here give our readers an idea of the three designs placed first by Mr. Currey. It will be remembered that the designs were referred to that gentleman for his professional opinion, and in accordance with his recommendations the plans marked "Light and Air" were unanimously adopted for execution, the authors being Messrs. Coe and Robinson. The report of the referee considered this design met the requirements the best, and was the lowest in cost. We understand the plans have been forwarded to the Local Government Board, and we may now lay before our readers the prominent features of the design. The authors

retain not only the school-rooms, which the instructions required to be preserved, but the north part of the front building facing Elder-road, which they say will effect a saving of £1,500. The general disposition of the schools is a rectangular arrangement upon the pavilion system, the girls' and boys' wings being symmetrically disposed on each side of the administrative block, with easy access to all parts of the establishment, two open areas on each side of the administrative block being formed. The children's day-rooms and dormitories have windows on both sides, and the wings are of two stories in height; the boys, girls, and infants are well separated and under control, and the communication is by covered corridors. We observe all day-rooms have convenient staircases at the ends, the lavatories and bath-rooms are centrally placed in each wing, and the dormitories are all on the first floor, with master's or mistress's bedrooms, and have their specially attached day-rooms. The boys' wing has a range of workshops in its rear, and the girls' the laundry, which is conveniently located near the infirmary. One of the most noticeable features in Messrs. Coe and Robinson's plan, and to which probably they largely owe their success, is that a separate entrance for goods and tradesmen is provided at the south-west corner of the boundary in Crown-hill, where also the probation wards and the porter's lodge are placed. Although there may be some objection to this arrangement it is obvious that it simplifies the economy of the establishment by avoiding unnecessary traffic through the principal buildings, and the probationers are kept distinct from the inmates of the school—at least till they are capable of being admitted. The infectious wards form a separate block behind the probation wards, and appear to be planned to the regulation requirements, while the infirmary is ingeniously contrived at the north-west angle, the wings and centre forming an obtuse-angled block fitting round the corner of site. Referring to the site the authors observe, "The site upon which it is proposed to be built offers many objections to a building of the ordinary type, the narrowness and slope of the slip of garden ground rendering the idea of a long building upon this ground facing the south quite untenable, whilst any building placed upon the wider ground south of the garden must either be a long building facing the east or in a quadrangular form, in which case the wards would be so near the boundary that an adjoining owner building upon his property could materially injure the efficiency of the infirmary." The plan shows the boys' ward on one side and the girls' on the other, the wards divided into one large ward for ordinary cases, a special ward and a convalescent ward—each wing having its own stairs and lift; 850 cubic feet are provided to each patient. In the centre are the surgery, nurses' rooms, operating room, kitchen, and other administrative offices. We find the infants are placed in the present building, and this part has been arranged for two classes of infants—those under five years and those from five to eight, each having their own day-room play-shed. Referring to the administrative block, the dining-hall forms the centre feature, accessible from the wings by corridors, and well placed as regards the kitchen and offices, which latter are to the north. The other apartments seem to conform pretty well with the regulations. We cannot go into details, but we see the authors propose to adopt the Banner system of ventilation to the drains—that the beds in dormitories are placed with their heads to the wall, and that double beds are provided. The estimated cost is £20,070.

The second premiated design—"Terra Cotta," by Messrs. F. H. Fowler and Ald-

winkle—presents a very different distribution of the boys' and girls' schools. Instead of enclosing areas forming a quadrangle with four enclosed courts, the school wings are reversed outwards, as it were, and the administrative block is quite isolated, except by corridor connections on each side with the wings. The existing boys' and girls' school is retained as a distinct block in the rear of the administration department for infants. We observe the entrance is in Elder-road, and this serves for all purposes. The wings are cleverly planned, and provide for that control and economy of administration which are so necessary in all buildings of this class. The authors have adopted the pavilion principle, and have apparently carried out that plan thoroughly in the separation of these buildings. Taking one wing—the boys'—on the south side, we observe that it forms a straight block, running east and west, with a one-story cross wing at the west end for workshops, and a similar wing at the east end as a school-room, &c. The main portion has a covered playground and day-room, 30ft. wide, with windows on both sides, staircases at the end and centre, connected with which is a lavatory and bath-room. Above the covered playground is a double dormitory, with projecting w.c.; over the centre are the head master's and nurses' rooms, in direct communication with the administration block by an open corridor; and over the general day-room is another double dormitory for four rows of beds, under the eye of the teacher. The centre rows of beds back to a dwarf platform, and are placed head to head. The authors, alluding to this arrangement, say it "admits of economy and convenience of supervision, and is preferable to long and narrow wards, or wards 18ft. to 20ft. wide, with three rows of beds." One good point we observe in this plan is, that the corridors are short, and another good feature is that the school-rooms are of one story, with open roof, and can be entered from the playground. There is a double class-room. With regard to the lavatories and baths, the authors say, "we propose one large lavatory upon the ground floor, in preference to several adjoining the respective dormitories. We have made this a subject of special inquiry with the superintendents of several large schools, and their strongly expressed opinion is that it is far preferable to have the lavatory work concentrated in one large apartment on the ground floor, as the children wash three times a day, and it would be very undesirable for them to be continually rushing up stairs." What we have above described applies also to the girls' wing on the north side. The dining-hall is placed in the centre of the administration building, and its axis aligns with the two connecting corridors of the wings, which, in fact, surround it on three sides. An open roof is provided, lighted by a lantern. Adjoining is the kitchen, and the offices are grouped at the back. The master's and matron's apartments, committee-room, &c., occupy the front portion, and above this is the chapel forming a central feature. The probationary wards are at the south-east corner of land, and we may mention the authors in one of their schemes have endeavoured to meet the Local Government Board in their circular respecting a separation of the children admitted the first week from those of the second. The authors place the infirmary in the position suggested—the south-west corner—and their plan provides for a classification of cases, for each sex into four—namely, ophthalmia, 12 boys and 14 girls; cutaneous, 9 boys and 12 girls; cutaneous with ophthalmia, 9 and 12; and ordinary sick, 12 and 14 respectively. On the whole, we have reason for believing Messrs. Fowler and Aldwinckle's plan closely follows the Local Government regulations in several

important particulars, especially as regards separation and economy of supervision of the schools. The blocks of buildings avoid the objection of the Government Board to right-angle buildings higher than one story, and the plan is, in our opinion, economical. The total cost is estimated at £33,700. It may be mentioned that Mr. Aldwinckle was associated with Mr. Parris as the architect of the workhouse buildings at Lambeth, while Mr. Fowler carried out the infirmary. We may add that the authors submitted three schemes—one based on the cottage system found to answer so well on the Continent, especially in Holland, and of which we should like to see a repetition here.

We have not been fortunate enough to examine the plans of the third premiated design by Mr. Edward Clarke, of Adam-street, Adelphi, but from the particulars kindly furnished us we understand the author has met the condition as to the retention of the old buildings by designing the "new girls' dormitories and day-rooms, as well as their dining-hall, in separate blocks," these being brought into communication by covered ways, which will take the same obliquity as the ground. The boys' school is similarly arranged, the whole being connected by a covered way. Referring to the entrances, the principal one will be under the notice of master or matron, the goods' entrance, under that of the porter, whose lodge is also close to entrance gates. Speaking of the administration blocks, the author says the entrance building on Elder-road is in so sound and substantial a condition that he has re-arranged it, and the basement stores, kitchen, &c., are retained. The buildings are planned on the pavilion principle; but the author observes, "no pavilion has any high buildings on both sides of it, each being kept a space of 25ft. apart, permitting full access of air and sunshine." The boys' school is kept in the old building, with some alterations in the partitions to give the 9 superficial feet required by the Local Government Board. New class-rooms are proposed at the end. The dormitory is above for 113 boys. The girls' school is similarly planned, and the infants' existing school is retained, though lengthened. One advantage claimed for this plan is that the wards and day-rooms are well placed as regards the sun, their axes being east and west, and no pavilion is shut in between high buildings. In the dormitories Mr. Clarke has remodelled some of the old ones, and provided new for 80 boys, 200 girls, and 50 infants. The regulation superficial area and cubic space have been allowed to each child—namely, 25ft. super. of floor, and 300 cubic feet of space. Fresh air is proposed to be admitted to the wards at several points by gratings in wall near floors, and at the upper parts of windows, and Howarth's Archimedean screw is to be introduced to facilitate extraction in connection with shafts in the wall, and boxes between girders. The style adopted is plain, and the cost is estimated at £25,100. The author has taken much trouble in preparing tables of areas and cubical contents of each apartment. It has not been our object here to compare the merits of the designs critically, but we hope to be able to publish all the three plans shortly.

THE GOLDSMITHS' PRIZE DESIGNS.

A LARGER and, on the whole, better display of competition designs than hitherto have been submitted to the Company of Goldsmiths for their annual prizes, and these are now to be seen at the South Kensington Museum. The court set apart for them is certainly more likely to draw the public and the student than the old and cold quarters in Tufton-street, though we are

sorry the Architectural Museum has not retained so desirable an accessory to its attractions. We cannot say that we are quite satisfied with the award of the judges in the competition this year, for it appears to us that the premiated designs, with the exception of one or two cases, are, in point of ability and artistic conception, much below others that have gone without reward. If we take the £50 prizes first, no one of any judgment in art design would have placed the "Tea and Coffee Service," by Mr. Morrisson, before Mr. J. Watkins' design for a casket under motto "Dice Box." The tea and coffee service might be attributed to a novice; it is a flashy, overwrought, and elaborate piece full of labour and some painstaking drawing, but certainly not a thoughtful or masterly design. The coffee and tea-pot do not at all accord in style, and there is a great lack of repose and simplicity. On the other hand, Mr. Watkins' design for a casket is a classical conception worked out with much taste, and the drawing is clever. The story of Meleager is pleasingly introduced in two square panels, one representing Althæa and the other Atalanta; the curvilinear top, pedimental in form, surmounted by a group, and the base with claw feet, both display merit of composition. The drawing is spirited, and executed in sepia; and, we may add, Mr. Watkins is no tyro in these contests, having taken prizes before, and only the year before last for a large shield. Another of the £50 prizes for plate is awarded to Mr. Alex. Creighton for a chimney-piece clock-case, under motto "Tempest." It is in silver and gilt, simple in outline, with domical top and an emblematic personation of Time, it has angle figures, and is mounted on a black marble moulded base, but we cannot award it much higher praise. For modelling the work this year is somewhat below the mark. Mr. Garbutt, a life student of the Architectural Museum, takes the £50 prize for a model of a shield, under motto "Olive Branch." It is convex, of circular shape, but the centre allegory is particularly wanting in unity. The relief figures of "Peace," "Spirit of Evil," and "Death" are badly grouped, and there is a singular want of aim and breadth in the composition generally. Equally displeasing to our mind are the great and uncouth masks introduced round the border, and the scrollwork, which are both out of scale and wanting in refinement. Far better specimens of modelling are two vases—one by Mr. Vigor, jun., a small vase with subjects in relief, elegant in outline and refined in the modelling of subjects—the cover is also chaste; and another model by Mr. Marshall, in the same case, albeit its outline is heavy, shows some admirably-composed groups in relief, executed with much spirit and feeling, and displaying the hand of a master, and we are surprised to find from the intelligent attendant that no prize has been awarded it. Passing to the case of plate, we may mention that one of the £25 prizes has been given to a goblet or tankard in repoussé work of exceedingly good outline, and the figure subjects surrounding the cup are bold and telling. In this case of objects in executed plate we notice some repoussé on steel and an excellently modelled bust, but the designs are generally indifferent, and some few of them indicate a poor conception of outline, and a total ignorance of the elements of plastic art. Another of the smaller prizes is awarded to a design for a silver salver by Mr. Tidmarsh. We have nothing to say in disparagement of the labour and careful drawing in Indian ink of this subject, but the design, to our mind, is destroyed by the overworked treatment of the relief subjects, illustrating Dryden's "Ode to Music." The centre feast is clever *per se*, but the effect with the border

medallions is anything but quiet, and the design, in our opinion, cannot compete in point of merit with another in the same screen under the motto of the "Three R's," which, for simplicity, breadth, and refined taste, is far its superior. The latter is in repoussé in oxidised silver, and the composition of figures and ornament in the rim and the centre leave little to be desired. The author, however, does not get a prize. Another prize is won by Mr. Rhead for a wine fountain or cooler. There is considerable merit in the drawing; the relief subjects are cleverly shaded in sepia, and the design of the figures good, but the upper part of vase is not pleasing, and is certainly ill-proportioned to the base. "Procrastination is the Thief of Time" is a well-designed "Treasure Box," of somewhat conventional form, and illustrating on its sides relief subjects of the "Toys of Childhood and Manhood" skilfully treated. We may also notice a clever drawing by Mr. Vigor of a Titan shield, oval in form, with a cleverly composed border, in which the warlike figures are skilfully handled. The centre figure and oval, however, suffer from extreme elongation and want of proportion. A design for a double mirror—"Venture"—is certainly original and clever. It is of ovoid form, surrounded by a frame of elegant treatment, from which pendent lights are hung, and the groups of figures on the base of the triangular stand and at the top, illustrative of features of Solomon's virtuous woman, and of "Simplicitas, Hilaritas, and Caritas," are exceedingly well grouped and appropriate. We think this design worthy of a prize. A design for a timepiece on the same screen is too naturalistic in treatment, but the four figures allegorical of Twilight and Night, Dawn and Gloom, are skilfully introduced at the ends and sides, Time surmounting the top of a simple lined composition. The drawing is cleverly executed, and in quite classical feeling. A few other works may be mentioned, such as a specimen of silver engraving for which a £25 prize is awarded. There is certainly a chasteness in the engraving that we admire. An inkstand under motto "Excelsior," with a good group of three figures, Renaissance in style; a tea service under the motto "Novelty," in which the artist has paid attention to the principles of form as applied to the treatment of vessels with handles, the ornament being simply incised on the surface; a rather cleverly-designed biscuit-box, with some well-designed figures in relief round it, under the motto "In Spe Laboro;" a spiritedly-drawn flagon, rather overdone, with crossed crayon and compasses as a motto; and a design for a reading lamp in silver gilt, with motto "Bagatelle," rather too low, but cleverly illustrated with medallion subjects round the base and stem. On the whole there is more merit to be found in the collection than there has been for the last few years, though we should be glad to find the student's work more taken out of the groove of the "silversmith's" style. In the execution and workmanship we especially mark the influence of trade patterns and types. Thus one of the engraved salvers is extremely naturalistic—so much so that the subject represented would have been better as an example of engraved work simply than intended to enrich a silver plate. In some of the repoussé work also the idea of metal relief has not been kept in view, and the modelling shown might be better adapted for wood or stone.

NEW BUILDINGS AT CHELSEA.

SOME time ago we drew a picture of modern Chelsea, as it has been partly rebuilt by the hands of some of the Queen Anne revivalists; and we called attention to some striking houses in Cheyne's-walk

and Queen's-road, facing the river—among them "Swan House," and several residences in the "Queen Anne" and Vernacular Gothic styles. We now draw attention to some new houses, built in a more pretentious manner, on the Cadogan estate—a site adjacent to Prince's Cricket-ground, and accessible from the Brompton-road or Sloane-street. It is hardly necessary to remark that, during the last and preceding centuries, Chelsea was a highly fashionable neighbourhood; and during the later Stuart era it held an important position in the art world. Its porcelain works were justly celebrated all over the world; and the tendency of its taste then was essentially towards that which prevailed in the Netherlands. The style of its buildings held undisputed sway; and the architects of our own day, with a sort of sentimental reverence, are now reproducing its older features.

Facing Cadogan-square a block of six red-brick houses, of mansion-like pretensions, has been erected, displaying among others the hand of Mr. Norman Shaw. The visitor to this part is struck by the variety of the gables, in which every conceivable form of Flemish quaintness has been attempted—albeit the diversity rather destroys the effect of accidental picturesqueness that has been aimed at. What with the right-lined and curvilinear—the studied irregularity of window spacing, and the conceits in the way of cut-brick "pedimentation" (if we may coin a word)—the eye is rather distracted, and we look in vain for that Old English or Low Dutch simplicity which we have been constrained to admire elsewhere. In this group of houses we at once perceive the dainty detail of Mr. Shaw in the centre house of the block. The house is of considerable frontage, five stories high, and is crowned by a straight-lined gable, finished by a small pediment, and broken on the face by pilaster-like projections, in rubbed brickwork, which divide the gable into two stories. Three close-set, large, and lofty-proportioned windows mark the chief story, and these have rubbed red-brick pediments, with rather heavily-carved keystones breaking through the mouldings. The sash-frames are, as usual, divided into small squares, painted white. On the right a projecting oriel of three stories of octagon shape, breaks forward and destroys the symmetrical division; and we regard this as the best bit in the whole elevation. Richly-carved panels, with brick carved festoons, form the finish at the top, below which is a bold and very effective cut-brick cornice. The lowest tier of windows is finished with small high-pitched pediments. The unfinished state of the lower part and interior does not permit of our saying anything at present with respect to them, though we have all the evidences of freshness and vivacity characteristic of the architect's work. In the adjoining houses, still unfinished, the style has been treated with less effect. The gables are overdone, and the pediments within pediments lack the more genuine vigour of the style. In execution, however, there is little to be desired (Messrs. T. Pink and Son are the builders). Mr. W. Young, in an adjoining block of four houses, is following—if we can judge from their present incomplete condition—a purer phase of the Renaissance; while Mr. J. J. Stevenson, at another end of the new square, has a large site, upon which are to be erected houses of the decidedly fashionable style. Overlooking Prince's Cricket-ground, in Pont-street, the last-named architect has been displaying all the resources of "Queen Anne" in a row of about twelve mansions, built in a very substantial manner by Mr. Thos. Pink. We must confess that, looking at them from a sharp perspective point of view, they scarcely come

up to our expectations; and we might have passed them over in a general survey of the locality. Their fronts are scrupulously executed in yellow, stock, and red brick, intermixed; but they rather jar on the eye, and produce something like what musicians call a "Dutch concert." In one or two instances ornamental red brick frontispieces are relieved upon white brick; but we prefer those entirely in the former material. Bay windows are largely introduced; and the porches display a singular diversity, and are open to the charge of being somewhat squat. In one case the brick porch is covered by a flat projection of the balcony, under which turned pillars are introduced, resting on the brick parapet of the porch; and we have the singular resemblance to a table resting upon it. Entering one of the more finished of these costly mansions, we find them very commodious. On the ground floor, the vestibule and hall are paved in mosaic; and we enter a morning room, having a bay window, with a chimney-piece of massive and effective design, partly marble, within a framing of rich oak mouldings. Above the mantelshelf there is a composition in oak, with mirrors, and richly-carved panels; the fireplace is splayed with tiles. Behind this room is a library, about 18ft. x 12ft., with a chimney-piece of similar design, though plainer, the floor, as in all the rooms, having a parquet border. Both these rooms have deep cornices and friezes; and in the front room we observed the frieze is enriched by painted subjects and folial scroll work. The cornice members are relieved in bright tints, and the walls are to be finished in grey or some neutral green. In the rear of the library is an area for light; and below the staircase a rather irregular area is converted into a lavatory and cloak-room. The dining-room forms the extreme end, its door opening from the back corridor facing the main hall. It is a fine room, about 30ft. x 20ft., with an end bay—the lower panes having painted glass, with emblematical devices. The walls, chimney-piece, and finishings are pleasing, though not so characteristically quaint as many others in the style. The hall and staircase are decidedly gloomy; and the great depth of the house seems to call for a lantern or top-light to this part, instead of the rather awkward and indirect means of lighting from the small court. The first floor has a front and back drawing-room, extending over the morning-room and library below—the dining-room being another large drawing-room, or *boudoir*; and these have been handsomely finished with carved oak chimney-pieces, relieved cornices, enriched friezes, and dados, with emblematic medallions and scrolls—the walls being painted in shades of colours of moderate tone, the warmer tints being reserved for those rooms having a north aspect. Mr. Chevalier, of Westbourne-grove, is the artist of the decorations. The upper floors contain twelve bedrooms, with conveniences; and the views from some of the rooms are very extensive. A serving-lift and a servants' staircase are provided; and stabling—including two stalls and loose box, coach-house, and coachman's rooms—is arranged in the rear. In many of the other houses a billiard-room is obtained at the back, on the ground floor. We may add that the rents of these houses range from £600 to £700 per annum, and the selling prices from £7,500 to £10,500. Two or three of the houses are already taken—one by Sir Charles Buchanan, and another by Lady Leveson Gower.

Two other blocks of red-brick mansions must be mentioned—one facing Pont-street, and the other abutting on Cadogan-square—Messrs. G. Trollope & Sons being the builders. One block consists of five, and the other of six houses. In plan the

arrangement of each house is compact. There is a dining-room, about 28ft. x 16ft., a library behind, and an area for lighting, with a billiard-room in the rear, on the ground floor; above, a fine front and back drawing-room, *en suite*, with a *boudoir* over the billiard-room. There are about eleven bedrooms and two dressing-rooms; and the houses are provided with back stairs and every convenience, though they are not sufficiently completed to enable us to form any idea of their internal fittings or decorations. Externally the architecture is of a more sedate kind than those we have been writing about; and the architect has introduced rather the more moderate features of the sombre brick architecture of the Early Georges than the half-Flemish peculiarities of Queen Anne. The centre house in Pont-street front is crowned by an ornamental cut gable, and, with the end houses, projects a little, allowing of a balcony being formed along the first floor of the intermediate houses on either side. This balcony is arched above with flat arches, supported on red Mansfield stone columns, forming an arcade. The stone corbelled balconies of the other houses are somewhat heavy and coarse in detail; but there is, on the whole, a breadth of treatment that is wanting in the other buildings we have described—which, when the block is completed, and the sashes are fixed and painted, will atone for the otherwise unredeeming effect of the red brick fronts. There is a pleasing harmony of contrast between the warm stone and the brick which avoids the patchy effect a lighter stone would have. Little carved brickwork is introduced, and this is only in the gables and the pediments, and carved figures in niches in the upper part of the piers to the ground story. The gable dormers and the chimney-stacks break the roof outline; and the blocks certainly contrast, in their mass and plainness, with other houses on the same estate. If we remember rightly, these red brick houses are from the design of Mr. J. T. Robinson, whose original drawing at the Academy, two years ago, we admired much, though the executed buildings, unfinished as they are, hardly bear out the sketch in colour.

Other large buildings have lately been erected on the Cadogan and Hans-place estates, but in a less characteristic style. In the Square we observe a few in a purer Renaissance garb; but the difficulty we find in all of them is the means for lighting the hall and centre rooms, owing to the necessity of providing more than two rooms in depth. The best mode of meeting this is to provide a central hall or staircase, which may be lighted at the top or at the side, from an area common to two houses, forming a balcony or gallery approach to the rooms in the rear. In Sloane-square a large block of new buildings is nearly completed in stock and red brick and stone, but having few pretensions to notice. We cannot leave the locality without referring to a church for the Roman Catholic communion approaching completion, from the design of Mr. Bentley. It is designed in an extremely severe style in white stock, with stone dressings, and is close to the new Cadogan-square, and on a prominent corner site. Both in outline and detail it displays the work of a master in Gothic; and we have seen few churches more thorough, or in a truer mediæval spirit. It has a nave, two aisles, and a transept—the last being kept flush with the aisle. The most pleasing view is the north-east, with a gable end of extreme simplicity, flanked by an octagon turret at the angle, finished below the gable. The end is pierced by four very narrow lancets, under an enclosing arch—the outer lancets being separated by narrow stone buttresses, springing out of a set-off below. The effect of this with the buttress and

turret is exceedingly dignified. Within this window is a drop-traceried arch, forming a passage between, having a very rich effect. The west end has also a four-light window, separated by buttresses. The clerestory is lofty, pierced by a number of narrow lancets, in recessed square heads, slightly cupped. The end of the north aisle forms a chapel, and has a Decorated tracery window; but this is the only ornate external feature in the whole building. A low conical tile-capped turret rises at the west end (between nave and aisle), and—with the unpretending lines of the nave, aisle, and transept, and the red-tile roofing—produce a very satisfactory ensemble. Messrs. Braid & Co., of Chelsea, are the builders.

M. EUGÈNE VÉRON ON ÆSTHETICS.

THE French have long enjoyed a certain supremacy in art. In all that pertains to the artistic instinct, in a keen appreciation of the beautiful and refined, in a nervous sense of artistic combinations in form and colour, the French are undoubtedly our superiors. If we are disposed to deny them the vigour, and sometimes originality, which characterise our own works, we cannot doubt their art has been less the victim of change and coarseness than ours. But the fact is more forcibly impressed upon us when we read their treatises on art and æsthetics and compare them with English books. We have seldom read a work of greater merit than that lately written by Eugène Véron, entitled "L'Esthétique," and which has just been freely, and we may add ably, translated by Mr. W. H. Armstrong, B.A., for Messrs. Chapman and Hall's "Library of Contemporary Science." We shall only dip into the book and endeavour to give the gist of his theory. M. Véron's treatise, we may say at once, attacks many of our conventional and long-treasured ideas about art. He disabuses the reader's mind of much cant and tall talk; he clears away much metaphysical dreaming, takes the subject out of the ideal mist with which it has been obscured, and tells us plainly that "art is nothing but a natural result of man's organisation." Those who have been dreaming of the transcendental origin of art and the artistic genius will perhaps be displeased by this definition, but the sooner they begin to recognise the fact that particular pleasure may be derived from certain combinations of forms, lines, and colours, the more hope is there of art becoming general and more intelligently understood. No one doubts now that music itself can be resolved into a law of harmonic succession of vibrations, and M. Véron maintains what has been asserted by a few others among us, that "the principles of the two groups of art find their explanation in the two sciences pertaining to the organs of sight and hearing—namely, optics and acoustics." Having brought the domain of art within that of science, he deduces another important principle, which we give in the words of Mr. Armstrong, his translator—namely, "that outside the material conditions that relate to optics and acoustics, that which dominates in a work of art, and gives it its special character, is the personality of its author." He goes on to say "the value of the work of art rests entirely upon the degree of energy with which it manifests the intellectual character and æsthetic impressions of its author." Here we have a statement which the artist who claims the most ideal origin for his art will not dispute. Then, again, some comfort will be gathered from the further qualification of the author, who adds in effect that the only rule imposed upon this personality is the mode of thinking and feeling of the public to which the work appeals. We further quote: "A poem may express senti-

ments or ideas, which, although they are incomprehensible to the contemporaries of the author, are not on that account the less worthy of the admiration of a more enlightened period or country. Such a want of harmony, as a matter of fact, often causes a work to fall rapidly into oblivion." But we pass on to remark that M. Véron treats all formulas that have imprisoned art—as "idealism," "naturalism," "realism"—as different points of view in regarding art which is not contained in any one of them. Each may recommend itself to certain individuals or national temperaments, but it is absurd to force them upon all. Thus, as he justly says, "it is ridiculous to condemn Flemish or Dutch art in the name of Greek"—a doctrine that ought to have its weight with those architects who stick to one style and ignore all others. One fact is also made clear—and that is, art is gradually withdrawing itself from mythology and metaphysics, though we cannot fully concur with the author in thinking that it is detaching itself entirely from symbolism in the direction of humanity—not so, at least, in one obvious direction. The tyranny of academic routine and official teaching is energetically exposed by M. Véron, and in this argument he supports and quotes largely from Viollet-le-Duc in the doctrine that great art writer has maintained with so much unflinching consistency, that without independence we can have neither art nor artists. Let those who have all along allied art, and especially architecture, with despotism, read M. Véron, "All the great art epochs have been epochs of liberty" (*Toutes les grandes époques artistiques ont été des époques de liberté*). "In the time of Pericles as in that of Leo X., in the France of the 13th century as in the Holland of the 17th, artists were able to work after their own fancies." No art dictatorship or official corporation interfered. The author might very well have added English art to this catalogue, less controlled as it is by academic training than in his own country. The Académie des Beaux-Arts, of course, comes in for a share of well-merited invective. It is said to be the most powerful enemy of progress. Dead forms of architecture are reproduced, and everywhere education is founded upon the imitation of the past. We need not follow any further the author in this opinion, shared as it must be by every well-wisher of architecture and art, and by every thinker in both France and England. Of the three forms of art—conventional, realistic, and personal—the latter only is considered as deserving the name. The first is pronounced the negation of art, the second is impossible, for the artist cannot "disappear entirely behind reality," while the "source of all poetry is the soul of the poet." Though we commend the principle of personality in art, we cannot go so far as to say that the Renaissance was an incoherent and impotent manifestation of art; the author himself in speaking of architecture, admits that it is the least personal of all the arts.

It would be impossible, in a brief notice, to give the views of the author upon the origin and grouping of the arts, the source of æsthetic pleasure, the definitions of taste and art, though of these we may mention M. Véron has accepted the physiological explanation of our sensations of pleasure as laid down by Herbert Spencer, Mr. Grant Allen, Professor Bain, and others. He also maintains that the principal forms of art "grew by a process of continuous duplication from written and spoken language." "Architecture," he says, "if not derived from written language, goes back to a common origin with it, linear composition and design being common to both." Under the organs of sight the following classification is given:—

Written language	} Sculpture, Painting, Architecture.
Order	
Proportion	
Simultaneousness	

We will confine ourselves in the present notice to M. Véron's views upon architecture in Part II., and here we can only glance at the conclusions. He first exposes the fantastic theories of M. Charles Blanc, who upholds the symbolic school, in "La Grammaire des Arts du Dessin," and of Lamennais, who holds a pantheistic theory of architecture; and in support of his views quotes from V. le Duc. Architecture is shown to have sprung from the natural aggrandisement of man's primitive dwellings. After convenience and use were satisfied, architecture strove to convey an idea and to excite admiration, and such admiration was the cause of artistic conceptions. After all then, according to the author, there is not such a mystery in the origin of architecture as some imagine. Style is the result of "methodical observance of a principle," according to Viollet-le-Duc, and is developed in works of art in exact "proportion as they spring from a just, truthful, and clear impression." The author's sympathies are undoubtedly on the side of Gothicism, and he is an ardent supporter of V. le Duc. We have only room left to give the conclusions of the author:—"Architecture is first an industry, and then an art. Whether its task be to construct a temple, a palace, or a theatre, it must in the first place accommodate its work to the predestined purpose. Nor is this all—due consideration must be given to the requirements of materials, climate, light, situation, and habits, which are all matters demanding great skill, tact, and forethought, but can hardly be considered as belonging to art in its strictest sense. They do not give the architect much opportunity for the exercise of his æsthetic powers. In the majority of cases," he goes on to say, "the forms of monuments were more or less borrowed from those of ordinary buildings, and were therefore determined by the ensemble of qualities and conditions which constituted the collective genius of the race, causing the individual and personal predilections of the artist to be under considerable restraint. Referring to expression, the author observes the power architecture has of giving it. It can be the calm or bold, graceful or powerful, solemn or gay, as the architect has the ability to observe the impressions of certain lines and their combinations. For instance, horizontal lines create ideas of stability and weight; vertical lines of boldness and aspiration; plain surfaces, if they predominate, suggest austerity and gloom; while many openings produce opposite ideas. M. Véron directs some trenchant remarks to architects in the following passage: "Great architects are those who are able to tell in advance, with accurate knowledge and feeling, the exact effect which all these various conditions will have in the finished building;" and this ability, he goes on to say, can only be acquired by a series of experiments in which each part is reduced to its just importance. Architecture remains, even from an æsthetic point of view, so dependent upon geometry, upon mechanics, and upon logic, that it is difficult to discover accurately the share which sentiment and imagination have in it. No architect can gainsay these remarks. How few of them, we wonder, really ponder and reflect upon the real forces they have at command, if they can only wield them aright? The illogical use of forms divorced from their original purpose, in order to act as ornaments, is reprobated with much force, and is likened to the tall phrases of the fine talkers of Molière and La Bruyère, who were never content to talk of things as they are. "We could wish," says our author, "that our architects would follow the ex-

ample of their predecessors instead of allowing themselves to be dragged through all sorts of queer ways by a deplorable spirit of eclecticism." It will be seen that M. Véron strikes at the root of many false notions and artistic prejudices; he clears away much that is mystical and confused in aesthetics, and defines it simply as the science of beauty in art. Art, we learn, is essentially subjective, and the artistic genius consists mainly in a faculty of seeing things in their *ensemble*—the artist, in fact, epitomises form; from the moment an idea seizes him, he exists for it alone, his creative power is essentially synthetic. The critic, on the other hand, has nothing in common with the artist, except love of art; they are opposite poles of humanity (their intellectual constitutions are different), while the work of the former is analytic, requiring the predominance of the reason. Finally, the author shows the irreconcilable processes of creation and criticism; he denounces the official art-teaching of France as a veritable bed of Procrustes, and affirms that all art worthy of the name is human and personal to a certain measure. It is still the individuality of the artist that produces art, the difference being that this personality formerly occupied in the search after the superhuman is now contented with love of truth and life. We thoroughly agree in the final remark, that if this be called a debasement of art we might as well say that Science debased herself when she substituted Why for Because, experiment for ontology, and when she added the study of the earth to that of the heavens. Into the subjects of sculpture, painting, music, and poetry, we have not entered, leaving to the reader these interesting sections of M. Véron's work.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE ordinary meetings of the Institute were resumed on Monday evening; the President, Mr. Charles Barry, F.S.A., in the chair. The Secretary read letters of condolence, written in the name of the Institute, to the Queen and to the widow of the late Mr. Frederick Pepys Cockerell, hon. secretary. The President mentioned that he had received a letter from Mr. Horace Jones, who was now in Venice and nearly restored in health, although it was to be feared their friend would be unable to return this session in time to read his promised paper on "Electric Lighting." Mr. Jones had presented to the Institute his designs for a bascule eastern bridge over the Thames, and also a medal of Temple Bar made from lead from the ruins. Amongst the members who attended for the first time since election were Mr. Calderon Marshall, R.A. (hon. associate); Mr. H. L. Florence, P.A.A. (fellow); and Mr. Charles Barry, jun., the President's son, and Mr. Herbert A. K. Gribble, introduced by the Secretary as "winner of the Brompton Oratory Competition" (associates). The following were elected to membership:—As fellows: Messrs. John Bryce, Edinburgh; Percival Gordon Smith (architect to the Local Government Board), Highfield, Stonebridge-park, Willesden; Thomas Edward Colcutt, 36, Bloomsbury-square, W.C.; and Thomas William Cutler, 5, Queen-square, Bloomsbury, W.C. As associates: Messrs. Septimus Cecil Searle, 66, Ludgate-hill, E.C.; Lewis Edward Hickmott, Rotherham, Yorkshire; John Frederic Shenton, Rotherham, Yorkshire; Adam Francis Watson, Lampport, Northamptonshire; William Daniel Bayliss, Singapore, Straits Settlements; Frederick Pinches, 359, Strand, W.C.; Charles Augustus Gould, 20, Great George-street, Westminster, S.W.; William Woodward, 13, Granville-square, W.C.; William Grollier, 17, Abchurch-lane, E.C. As honorary associate: Mr. John Everett Millais, R.A., 2, Palace-gate, W.

REMAINS OF BUILDINGS IN MIDIAN.

The PRESIDENT invited discussion on Captain Burton's paper, read at last meeting (page 637,

Vol. XXXV.), expressing a fear that no member had visited the land of Midian, and hence there would be no opportunity of contradicting the statements made. Captain Burton had begun by apologising for reading such a paper in that room, but although he had spoken of very few architectural remains, and only in a single instance had described a detail, yet he had found extensive traces of buildings, which led to conjectures as to their use and character. Apart from architecture the subject was an interesting one, and no apology was needed.

Professor KERR inquired whether Captain Burton had seen any architectural proof that any of the remains were anterior in date to the Roman epoch.

Captain BURTON said the buildings were constructed of a crumbling alabaster, and might be of any age. Amongst the coins he had found was a forgery of a Greek coin of 300 B.C., made of a plate of copper with thin coat of silver. With it were barbarously executed local coins of genuine metal. He only knew of one dolmen in Midian, described to him as a flat stone, supported on three others, but this he did not see. He found some stone circles, which were common all over Arabia. He indicated on the map the places which he thought would best repay mining—one near El-Muwaylah, for copper and silver, and one at El-Marwah for gold. The Egyptian mines were almost worked out to the last fibre, but in many places in Midian the workings were not more than 40ft. deep, for the miners were not able to cope with water.

THE MODERN RESTAURANT.

A paper bearing this title, by Mr. THOMAS VERITY, was read for him by the Secretary. Having remarked upon the insufficiency, dirt, and discomfort of the accommodation provided till very recently in London for those who sought their dinners elsewhere than in their own houses, the author said that recently some well and handsomely-appointed saloons had been opened for supplying refreshments—a change for which the public were in no small measure indebted to the proprietors of the Criterion. The site upon which it stands was formerly occupied by two hotels, both celebrated in their time—the White Bear and Webb's; the former was one of the old-fashioned galleried inns. As, after a trial of seven years, said Mr. Verity, the proprietors can suggest no material alterations, the Criterion may be considered to fairly meet the requirements of business. By the aid of a series of diagrams, plans, and sections, the building was described in detail. (We illustrated the Piccadilly façade and ground and grand-hall floor plans March 21, 1873, Vol. XXIV., p. 330, and further described the building on the occasion of the Institute conference visit, June 26, 1874, Vol. XXVI., p. 709). The public portion includes dining-rooms of various capacity, restaurant, grill-room, buffet, smoking-room, a grand hall (now used as a *table-d'hôte*, but originally intended for a ball-room), lavatories, retiring and cloak rooms, and a theatre. The service departments are arranged in a central block one over the other, corresponding in level with the different dining-rooms, and in communication with one another by means of lifts and staircases. They comprise kitchens, sculleries, larders, pantries, cleaning-rooms, wine, beer, and ice cellars, and store-rooms for plate, glass, linen, groceries, and all kinds of provisions. The general arrangements are: on the ground floor—the principal entrance, in the centre of the Piccadilly façade, under a recessed archway, opening into a vestibule, 30ft. by 25ft., forming the central means of communication with all the public rooms. On the right of the vestibule is the restaurant, 70ft. by 30ft., and on the left the buffet, 90ft. by 25ft., with smoking-room, 40ft. by 25ft., at the further end. There is also a side entrance to the buffet from Piccadilly, having on the right a small bar, and on the left a cigar shop, and another entrance to the buffet from Jermyn-street by the secondary staircase. Advantage has been taken of the difference of level in the streets to obtain in a half-basement a second-class dining or grill-room, while to gain greater height the floor of the smoking-room has been raised 2ft. above the general level. On the first floor on either

side of the vestibule are rooms, each 50ft. by 25ft., for banquets, &c., and ranged along the corridor are private rooms of different sizes for parties from ten to fifty persons. On the second floor is a large room approached by either staircase, used principally for Masonic purposes. On this floor, but at a somewhat higher level, is the grand hall, 80ft. by 50ft., and 35ft. high; this room occupies the whole length of the Piccadilly front, and is lighted by the range of great windows looking towards the street, and by a large glazed dome in the centre. The kitchens and servery are arranged on six successive stories in a vertical series in direct communication by means of lifts and the servants' staircase. The dormitories for the barmaids and managers are arranged round the dome in the roof over the grand hall in two stories, and accommodate twenty-four persons. The stores' entrance is in Jermyn-street, everything being conveyed by a lift in the area to the lowest basement, where the receiving clerk checks them, and passes them to their proper receptacles, from whence they are issued as required. Up to the present time the wine and beer cellars have been temporarily housed in the adjoining premises in Piccadilly, which are now being rebuilt and added to the Criterion. The idea of an underground theatre was suggested by the *Athénée* in Paris, but whereas that is only partially sunk, this is entirely below the ground floor. It was not originally intended for this purpose, but as a small concert-room, and was, indeed, constructed as a square galleried-room, and it was not until the entire carcass was built that it was determined to convert it into a theatre. Its position has been somewhat severely criticised, and all kinds of prophecies were made concerning it, some even going so far as to say that the audience would be stifled; but from careful observations of the temperature of most of the London theatres, this has been found to compare very favourably with the best. The entrance to the stalls and boxes is on the right of the central archway in Piccadilly, and for the pit and gallery from Jermyn-street, the corridors and staircases throughout being entirely fireproof. After much controversy with the Metropolitan Board of Works it was agreed that the floor formed a sufficiently fireproof party division to enable the theatre and restaurant to be considered "separate buildings." The entrances were ultimately modified, so that there was no connection between the two, except through the outer lobbies. The theatre occupies the length of the Piccadilly front, 80ft. by 50ft., and the height from stalls to ceiling is 27ft. It will accommodate over 1,000 persons. The stage is 25ft. deep with a proscenium opening of 22ft. Dressing-rooms are provided on both sides and under the stage, the entrance for professionals being by a separate staircase in the Jermyn-street area. Cloak and retiring-rooms are provided for all classes on both sides of the house. Only very limited storage is provided for properties, &c., the stores and carpenters' shop being elsewhere. The theatre, buffet, restaurant, and grand hall, are lighted at night by sunlights, having flues formed in the floors by placing rolled iron joists about 2ft. apart with slate bottoms and covers to contain the iron pipes, of which each light has three. The stage having such a limited height, the appliances are of a very special character, particularly as regards lighting. Wing burners are almost entirely dispensed with, the batton lights being mainly depended upon to light the scene. These have iron hoods with flue pipes, coated thickly with Leroy's cement, leading to the extracting shafts at the top of the building. The only naked lights on the stage are the float in front. For ventilating the apparatus has been divided into two divisions, one being the theatre, the large hall, restaurant, &c., and the other for the buffet, smoking-room, grill-room, and the dining-rooms facing Jermyn-street. For the ventilation of the theatre a fan is provided, 4ft. 6in. diameter, worked by a direct-acting steam-engine. It draws its supply down a series of air-shafts, formed in the main eastern wall, and forces it into an air-chamber formed under the theatre floor. From this chamber shafts are carried up in the walls to diffuse the fresh air at different levels around the whole

space. In addition to these branch distributing channels are provided for a supply of air for stalls and pit. Hot-water pipes arranged in coils are fixed in the chambers, in order that when found necessary the air may be warmed before its distribution. A water spray is also fixed in the main cold air supply for cleansing. For the extraction of vitiated air from the theatre, a centre perforation, 5ft., is provided, in direct communication with a powerful extraction shaft, 4ft. by 3ft., running up the entire height of the building. The waste heat from the grill store, and the products of combustion from sun-burner that lights the theatre, are carried up the centre of this shaft, in independent wrought-iron pipes. At the gallery level, and also at the back of the stage, four other retraction shafts are provided. When this apparatus is in full working the air supplied and extracted is equal to the entire renewal of the cubic contents of the theatre from five to six times per hour. The ventilation arrangements for the large hall consist of a series of inlets of fresh air around three sides of the hall, in direct communication with the chamber already described. The vitiated air is removed through the sun-burner, the perforations round it communicating with a main extractor formed over the dome. This plan of ventilation is generally applied to all the rooms. The hot-water services are worked by a steam heater fixed in basement, from which a 2in. continuous flow is carried through the departments, terminating in two spacious circulating cisterns, and a return pipe is taken back to the heater, passing all the lavatories. The questions of water supply and lifting machinery were considered by Messrs. Eastons and Anderson, who drew out a scheme, carried out by Messrs. Turner and Co., of East-street. A 5in. pipe is connected to the water main in Piccadilly, which, immediately on entering the building, branches into two pipes, each with a meter attached. One of these pipes supplies at high and the other at low pressure. On the roof a cast-iron tank is fixed, about 20ft. by 30ft., and about 4ft. deep, and from it are taken the supplies to the kitchens and other parts as well as to the lift. In the basement a brick tank is made, lined with asphalt, and to it is connected the service from the low-pressure pipe, and also the overflow from the other tank. The water discharged by the lift on its descent is conducted to the brick tank, near which is fixed a steam-pump, which draws the water from the brick tank and forces it up to the cast-iron one on roof. Thus no waste of water occurs, and the cost of the power for working the lift is represented by the steam used for driving the pump. The boilers provided for the heating and ventilating and the cooking apparatus also supply the steam required by the pump. On the high-pressure main and on the supply-pipe to lift are fixed on each floor fire-cocks with hose and connections; and since the upper tank has some 10,000 gallons of water in it a large supply is available in case of fire. The hydraulic lift consists of a wrought turned ram, 7½in. diameter, working water-tight through a gland at the top of a cylinder sunk into the ground, and has an oak cage on the top of it, with the necessary guides, valves, balance weight, &c. The length of the ram exceeds by about 3ft. the total height of the ascent cage (72ft.), being the height of the top kitchen floor above the lowest basement. The well for the lift cylinder is sunk to a depth below the basement of 80ft., or 110ft. below Piccadilly; it is lined with 9in. brickwork in cement, and finished 3ft. diameter in the clear. The London clay was not passed through until the extreme bottom of the well was reached, when a little water made its appearance. After the completion of the well it gradually rose until it attained a height of about 60ft. from the bottom. All the food lifts are worked by hand by means of an endless rope. The basement is considerably below the main sewer in Piccadilly, and it was thought that all the sewage would have to be pumped up, but fortunately it was found that in Regent-street there existed an old sewer 40ft. below the roadway. Permission to enter this was given, and a barrel drain was driven up Jermyn-street, into which all the sewage passes. Although provision had been made for arresting and collecting fat and refuse

by means of traps, yet it was found that a large portion passed into the down pipes, where it quickly got chilled and adhered to the surfaces, causing partial stoppages; this was at last remedied by turning the waste steam into them, which has the effect of keeping them warm, and so preventing any deposit. The first efforts were a mistake, as the steam was turned into the cast-iron floor gutters, and, owing to expansion and contraction, the joints soon became leaky. As to the general construction the whole of ground was excavated 30ft. below the level of Piccadilly, and the adjoining buildings underpinned. To keep the water back, the system was adopted of first building the back portion of the underpinning 14in. thick and rendering it with asphalt, leaving bond for the face work, the bonders being coated with and set in asphalt, as the outer work came up. The result is perfectly satisfactory. The concrete for foundations and the mortar is General Scott's selenitic; the floors throughout are fireproof, the basement and ground floor on Fox and Barrett's principle, and the upper floors on Dennett's system. All the main stanchions are protected by brickwork, and the girders either by concrete or plaster. During the building various modifications were made from time to time, which, in some cases, caused an entire change of the system of girders; the most notable being that caused by the conversion of the theatre. The Piccadilly roof consists of four Warren girders, 17ft. deep, the roof shape being made by saddle frames fixed to the backs, the whole very light and giving plenty of space for the dormitories. The whole of the Jermyn-street roof space being required, there could be no principals. It is, therefore, formed with an upper and lower curb as tension and compression girders, the whole of the strains being discharged at the angles. The distinguishing feature of the decorations is the tile work. It is here used very extensively as wall decoration, and it has the advantages of being bright and clean, practically indestructible, and not too expensive, and what is most important it will wash. The cartoons for the figure subjects were drawn by Mr. A. S. Coke, and the work was executed by Messrs. Simpson and Son, who also carried out the painted decorations in the various rooms and in the theatre. The room floors are laid out with parquetry by various makers. The vestibule is paved with marble mosaic by Barke. The building now in course of erection on the east side of the Criterion will contain on the ground floor a buffet and smoking-room, 29ft. by 70ft., with a still room at the end, to supply both the bar in the present building and also the additional one. The first floor is designed to be used either as separate dining rooms or a suite of Masonic rooms. The upper floor will be in communication with the grand hall, by means of a large opening which may be closed at pleasure by shutters, so that it may be used either as an extension for the *table d'hôte* or for private banquets. The service of all these rooms will be from the present kitchens. In concluding his paper, Mr. Verity referred to the Gaiety, which he has just reconstructed. There the business consists entirely of public dining. There are no private rooms. On the basement is a large grill-room, 90ft. by 33ft., with a double grill at one end and a dispense bar at the other. The grill is shut off from the room by a glazed screen, by which means, while all the operations of cooking the chops and steaks can be seen, the heat and smell are avoided. The room is very low, and mainly depends for light upon gas. The burners are enclosed in ceiling lanterns, having ventilating tubes constructed in the floor and entirely enclosed in the Dennett arching, so that there is no heat from this source. The buffet on the ground floor is 91ft. 6in. by 30ft., on the same principle as the Criterion, with a bar along one side, and lounges with tables on the other. On the first floor is the *table d'hôte*, the same size as the bar below, but the old floors above having been retained it is of somewhat limited height. The whole of the cooking is done on the top floor, and the means of communication is by lifts, of which there are three varieties. In re-constructing this building it became necessary to take out the whole of the Strand front and a part of the side front, as the former mezzanine was removed to give greater height

to the buffet. This involved a work of underpinning, probably the most extensive yet accomplished. This was done most skilfully, and with the most satisfactory result, by the contractors, Messrs. Geo. Smith and Co.

The President in proposing a vote of thanks to Mr. Verity, mentioned that in one of the maps of old London, in Mr. Craco's collection at South Kensington, there is in the fields on the site of the Criterion a little building marked "Gambling House." *Absit omen!* He suggested it would be desirable that, prior to the discussion, the members should have an opportunity of examining this building in detail, to which Mr. Verity replied that he would see Messrs. Spiers and Pond, and endeavour to arrange a meeting for Monday next, at 11 a.m.

STREET LIGHTING.

DURING the past seven days some remarkable experiments have been made by the Phoenix Gas Company, and other gas companies have intimated their intention to follow the lead. From the London and South-Western Railway Station to the foot of Waterloo-bridge is a broad road about 500 yards in length, till now dimly illuminated by the regulation sized gas-lamps, which are but little assisted by the light from the shops. The Phoenix Gas Company have boldly undertaken at their own expense to show what can be done with gas liberally though not extravagantly expended, and the result is satisfactory. The ordinary lamps have been fitted with burners, giving a light equal to 50 candles; while at crossings and corners burners ranging in power from 130 to 200 candles have been erected. The cost of the illumination has, of course, been materially increased, but the increase of light exceeds the proportionate cost of the gas, and Mr. Woodall, the engineer to the Phoenix Company, has demonstrated the fact that if the public desire a better light they can have it by paying for it. The number of lamps and the site selected facilitate comparison with the Jablochkoff candles on the Viaduct, and taking Mr. Woodall's figures we find that the brilliant gas illumination in Waterloo-road, if reduced at midnight, costs 1s. 2d. per hour, and as each lamp on the Viaduct costs 5d. an hour for the Jablochkoff candle only, the illumination supplied by gas is far cheaper than that of the electric system the Metropolitan Board of Works and the Commissioners of Sewers have chosen to experiment with. Similar experiments are about to be made by the Chartered Gas Company in the neighbourhood of the Athenæum Club—a burner of 200 candle power being placed a little south of the Guards' Memorial, two lamps of 120 candles each at Regent-circus, while the 38 intervening lamps will have an illuminating power of 80 candles each. In front of St. Stephen's Club one of Mr. Higham's lighthouse burners is to be erected, and in other places of public resort efforts will be made to meet the electric light by an increased and more economical use of gas. It remains to be seen whether the electricians can beat the gas engineers. The experiment in the Waterloo-road contrasts very favourably with that on the Embankment.

The village of Duffield, in the area of the rural sanitary authority of Belper, is about to be formed into a special drainage district. A system of sewers will be laid down, and the sewage disposed of by irrigation on an outfall site to be hired on lease from Lord Scarsdale. Mr. Thompson is the engineer for the scheme.

A three-light window in St. Mary's Church, Stafford, has been filled with stained glass by Messrs. Mayer and Co., of Munich and London. The subjects are six in number, and are taken from the life of Our Lord.

The Cardiff Town Council occupied on Monday for the first time the new council chamber—a portion of the town hall extensions carried out from the designs of Messrs. James and Seward by the executors of the late Mr. Jacob Bateb. In the course of the meeting a private bill was approved for the carrying out various improvements, including the purchase of the water-works, the enlargement of borrowing powers, and the making and enforcing of new by-laws and regulations. Mr. Peter Price was instructed to proceed with plans and estimates for a free library, to be erected on a site in Working and Trinity-streets, at an estimated cost of £13,000, the amount of commission to be 2½ per cent.

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ILLUSTRATIONS.

CHURCH OF ST. MICHAEL AND ALL ANGELS AT BEDFORD-PARK—NEW CLOTHING MANUFACTORY AT LEEDS—HOUSE AT SURBITON—SKETCHES OF PANELS WITH FOLIAGE—PRIZE DESIGN FOR A DAIRY HOMESTEAD.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NEW CLOTHING MANUFACTORY AND WAREHOUSE, LEEDS.

The site on which this building stands is situate on the south side of Park-square, and was formerly occupied by a terrace of nine good houses, which had to be taken down. The building is in the Moorish style of architecture, and was designed by Mr. Thomas Ambler, architect, Leeds. It is built of selected hand-made pressed bricks, and red and buff terra cotta is used for the dressings. The four sides of the building are treated uniformly with the front, the north-west angle turret being used as a chimney to carry off the vitiated atmosphere from the gas engines as well as from the heating apparatus. The basement floor is used as a cutting-room, in which are a number of cutting-machines with endless knives, driven by power, the cloth being folded in layers, sometimes to the extent of one hundred and forty or fifty. The pattern of the garment is marked on the top, and the whole are thus passed quickly through the machine. There are three of Crossley's patent silent gas-engines, each of 8 h.p. One engine consumes about 8,000 cubic feet of gas per week. Two of them drive all the cutting machines, the hoist, and all the sewing-machines; the other is held as a reserve. White glazed bricks are used on the basement and third floors. On the ground floor are counting-house, two private offices, with lavatory and w.c.'s, packing-room, receiving-room, and warehouse-room for cloth. The first floor has no subdivisions, and is used entirely as a stock-room for made-up garments. The second floor is subdivided so as to provide in one-half of it a large dining-room, cloak-room, dressing-room, with lavatories and w.c.'s for the use of the females employed on the premises. The other half is used as a work-room. The third floor is used as a sewing-machine-room, with accommodation for upwards of 200 sewing machines, which are worked on an entirely new system, the patent of Mr. John Barran, jun. The roof is divided into four spans, the north side of each being glazed with rough plate-glass. The floors are formed with rolled-iron transverse beams, supporting 11in. x 4in., dressed longitudinal joists, 3ft. centres, and the whole covered with 3in. planks with iron tongues, dressed on the under side, stained, and varnished. The office walls are lined with pitch-pine framing, and the ceilings have moulded ribs and panels filled in with narrow V-jointed boards. All the joiner's work is of pitch pine, stained and varnished. The building is heated by hot water. The terra-cotta work was supplied by Messrs. Doulton and Co., of London. In the workpeople's staircase (which is fireproof) is carried up a 6in. water main, and on each landing is provided a double hydrant with valves and hose pipes. The following were the contractors—viz., brickwork, Messrs. Bentley and Burn; joiner and carpenter, Mr. John Tomlinson; plastering, Mr. John Senior; painting, Messrs. Wood and Son; slating, Messrs. Watson, Wormald, and Co.; plumbing, Mr. F. Johnson, all of Leeds.

HOUSE AT SURBITON.

WE this week illustrate a design by Mr. Rowland Plumbe, architect, of Fitzroy-square, for additions and alterations to a house at Surbiton. The old building had a Doric portico in centre, leading to a staircase passage, with rooms on either side, each having bay windows. Externally it was covered with stucco, the whole being of the ordinary type of speculative builder's work. In the plan of the new house the old dining-room is heightened by the removal of the ceiling, and is turned into a hall two stories high. Round this are arranged a billiard-room, with retiring-room, a new staircase hall, business-room, drawing-room, boudoir, flower-room, and dining-room. The old dining-room is converted into a serving-room and library. The old staircase is made to serve for a secondary staircase. The kitchen offices are on the basement, and there are three floors of bedrooms above the ground floor. Externally, the old building is nearly surrounded by the new. The old roof of slate is removed, and a new porch and bay-window nearly cover the remainder of the old work; but in places where the stucco work would have shown, it has been brought into harmony with the new building by being covered with a red brick casing on the basement and ground floor, and with tile hanging above. A new tile-roof is put on, spanning the whole width of the buildings. The materials used are red brick, relieved by tile hangings and half-timbered work, old tiles being used for the roof. The estimated cost is £7,000.

FOLIAGE FROM AMIENS—ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB.

THESE interesting examples of foliage from Amiens Cathedral are worthy of the closest study, and our drawings to-day, which have been selected from the sketches of the members of the Royal Architectural Sketching Club, show the designs both truthfully and well, with the advantage of having been finished in pen and ink at the Museum from the casts there, which are almost equal to the original works. The drawings are by Mr. T. Fredk. Pennington, to whom the Council of the Museum awarded their annual prize of five guineas last year for the best series of sketches made during the session in connection with the club. Particulars of the club may be obtained of the curator, at the Museum, Westminster. Other drawings by other members will from time to time be given in our pages as space may permit.

CHURCH OF ST. MICHAEL AND ALL ANGELS, BEDFORD-PARK.

WE have already briefly referred to the interesting and unusually picturesque church of St. Michael and All Angels, Bedford-park, in our "Office Table" notes the week before last; and to-day, in obedience to the promise then made, we illustrate the building by a series of working drawings, which include the three main elevations, two general sections, with two minor ones of the porch. These will be followed by others, including the plan, which shows the church to consist of a rather wide nave, having aisles on either side, a chancel and organ chamber, with vestry beyond, and a large south porch at the western end. The chief interest, however, in the design, which is characteristic of its author, is not found so much in its plan as in the architectural style employed. The drawings will explain themselves. The materials to be used are brick for the walling, with stone dressings, and cut-brick cornices and gables. The roofs are covered with tiles; and the woodwork externally will be finished in white. Internally the woodwork will be painted a sage sort of green, and the sanctuary will be hung with embossed gilt leather. The bases and lower parts of the columns to the nave arcade will be covered with dado panelling to the height of the dwarf wall of the chancel screen, which is seen in our "section looking east," which we publish to-day. The walls of the aisles and chancel are also lined with a wooden dado. The pretty treatment of balconies in the sort of triforium is hardly clear without the longitudinal section which we hope to give next week. They are, however, shown in section, in a drawing herewith of the nave. The work is to commence in

a week or two, and it is hoped that the church will be consecrated before the end of the year. The site occupies a commanding position at the entrance to the Bedford-park Estate, at the end of the Woodstock-road, and to the right of the Turnham-green railway station. Trees are already planted, and with the picturesque new houses, and row of fine old poplars to the rear, the church will have everything to gain from its position, for which it is so well suited. Mr. R. Norman Shaw, R.A., is the architect of the work.

DAIRY HOMESTEAD.

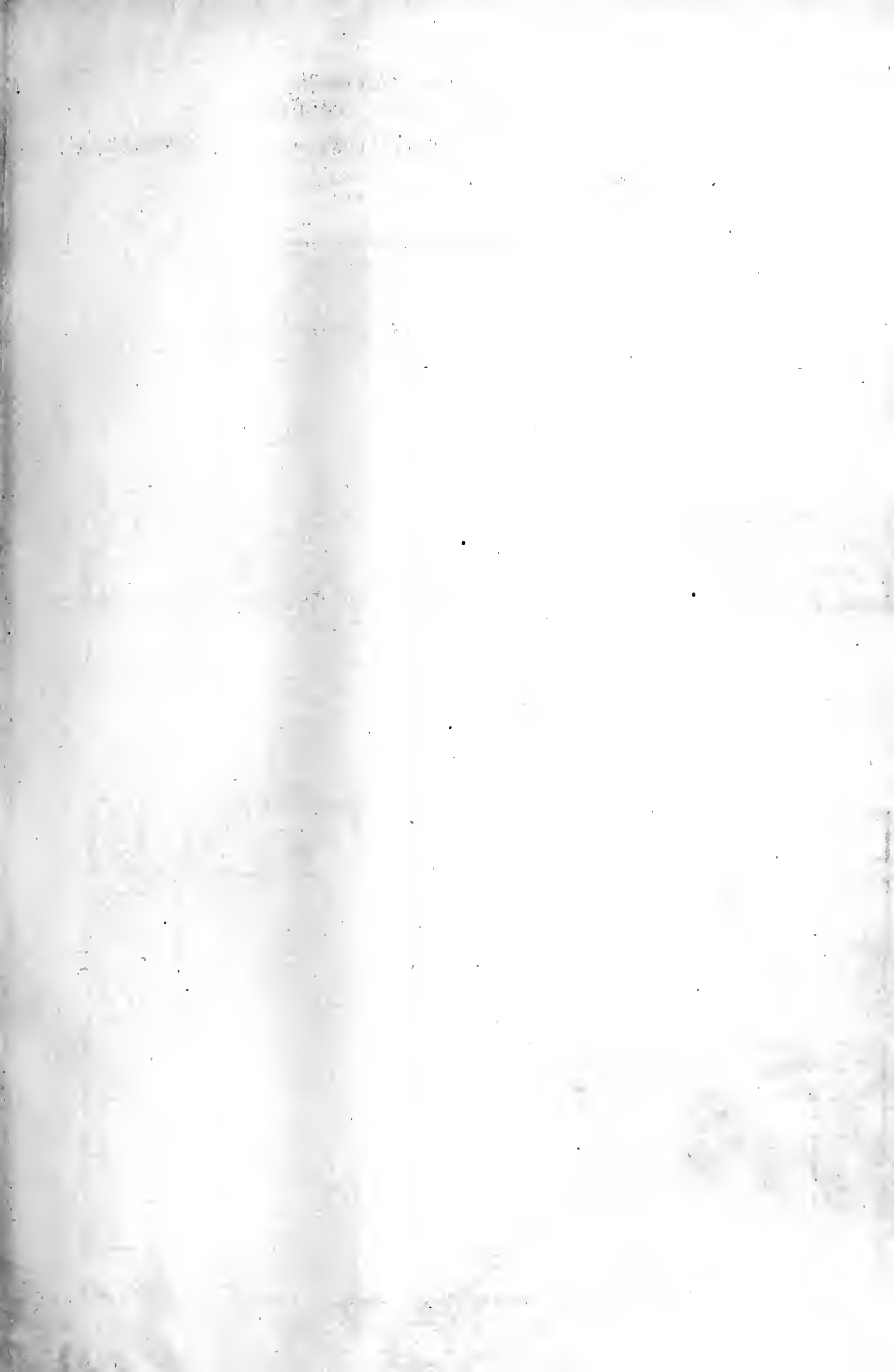
THE agriculture of Great Britain is just now in a transition state. An improved and rapid means of transit brings the agricultural products of all nations into direct competition with those of our own country; hence the breeding and rearing of stock and the production of milk is a more profitable industry than the growth of cereals. The great retarding cause of the expansion of the system is the general want of suitable buildings for the preparation of the food and shelter for the stock. The improved method of management which now obtains renders the erection of large expansive barns no longer a necessity. In the designing of farm buildings economy of labour is an important essential to be considered. Shelter and warmth are food economisers; hence the practical utility of covered yards. In the accompanying design we have endeavoured to combine utility and economy. Stores and food-preparing departments are centrally situated, and have direct communication to all parts of the yard by means of a tramway. As far as practicable, all the internal fences or divisions are constructed of tubular iron. After many years' practical experience we find these both economical and efficient. The rain water from the roofs is conducted through the hollow columns on which the roofs rest, into separate drains, and flows into a brick tank, from which the steam engine directly draws its supplies. The farmhouse, labourers' cottages, and covered hay-barns are conveniently situated.—G. M.

The great increase in the population of the district of St. Mary's, near Southampton, mainly attributable to the establishment in its midst of the shipbuilding works of Messrs. Oswald, Mordaunt, and Co., has led to the formation of a burial board. An excellent site having been obtained, the board issued invitations to the local architects to supply designs in competition for the chapele, entrance lodge, and laying out the cemetery, the result being the selection of the design marked "Gabriel Grub," the author of which proved to be Mr. W. H. Mitchell, of Southampton. Tenders were received both for laying out the grounds and erecting of the buildings by the board at their meeting on Tuesday week, when it was decided to carry out the work forthwith. The total cost, including site, is estimated at £3,000.

The thirteenth annual report of the Cork Improved Dwellings Company, presented at the meeting held yesterday, shows a net profit to revenue account, allowing of a dividend of 6 per cent. per annum being declared, and the carrying forward of £530 17s. 4d.

The Carmarthen Board of Guardians discussed, a fortnight since, what steps should be taken as to providing additional workhouse accommodation, the Local Government Board inspector having insisted on the necessity for erecting a separate block for 40 or 50 children, including dormitories, day-rooms, and lavatories. The vice-chairman (a Mr. Williams) suggested that the cost of plans for such a building need not exceed £5, and proposed that they advertise for plans and offer £5 for the best. The chairman and others protested that such a course would not be true economy, and after much discussion it was decided to advertise for tenders for the execution of the work, the majority of the board being under the impression that no addition will be made to the cost by expecting the contractor to provide his own plans and specification.

The School Board for St. Mary Extra (a district separated from Southampton proper by the river Itchen) recently advertised for plans in competition for a school for 350 boys and master's residence. Eleven sets of plans were sent in under motto. The design marked "Clansentum," by Mr. W. H. Mitchell, architect, of Southampton, was selected. The buildings are to be commenced early in the spring. The tender of Mr. J. W. Rowland, a local builder, amounting to £2,770, exclusive of school fittings and furniture, has been accepted. The estimated cost, including architect's commission, purchase and conveyance of land, fittings, &c., is £3,800.



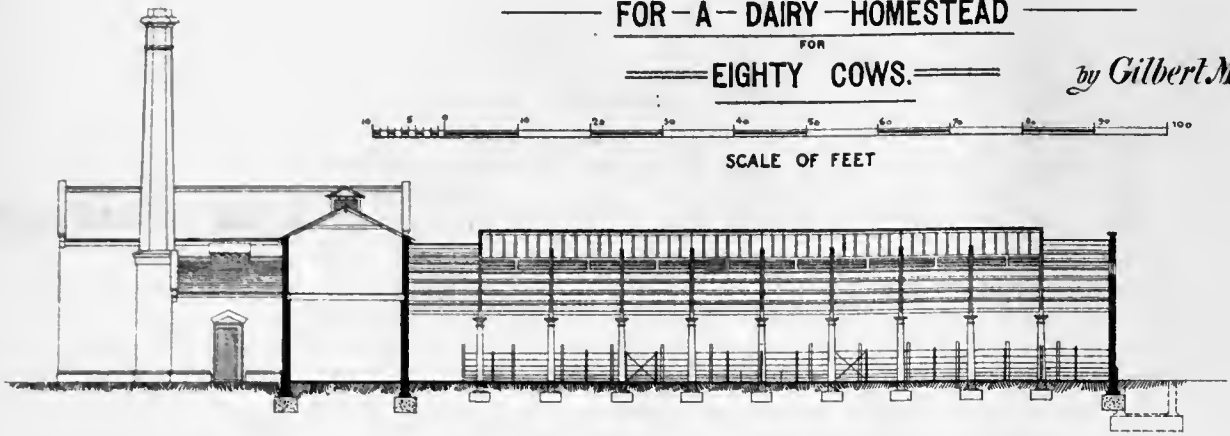
FIRST PRIZE DESIGN
FOR — A — DAIRY — HOMESTEAD —

FOR
EIGHTY COWS.

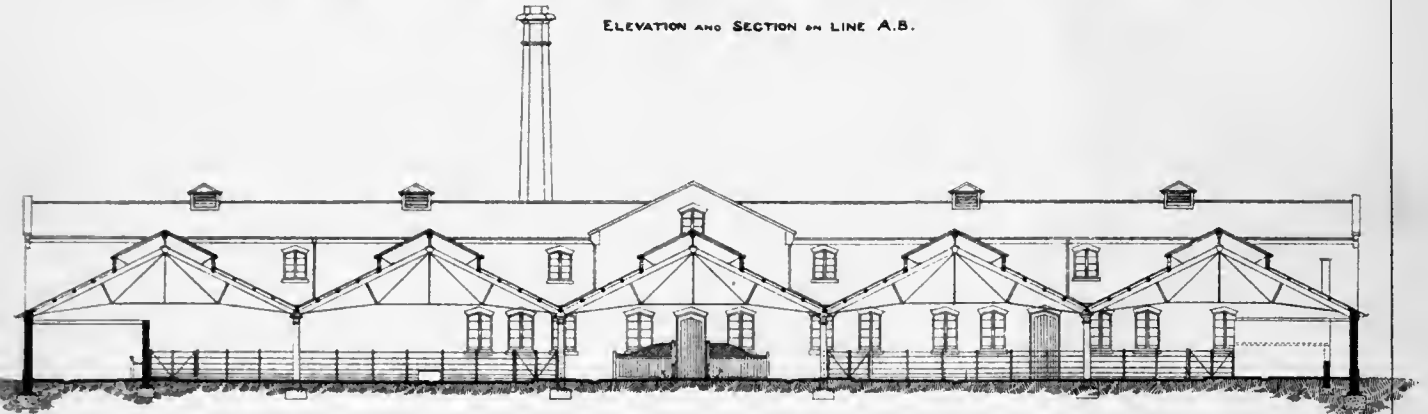
by Gilbert Murray

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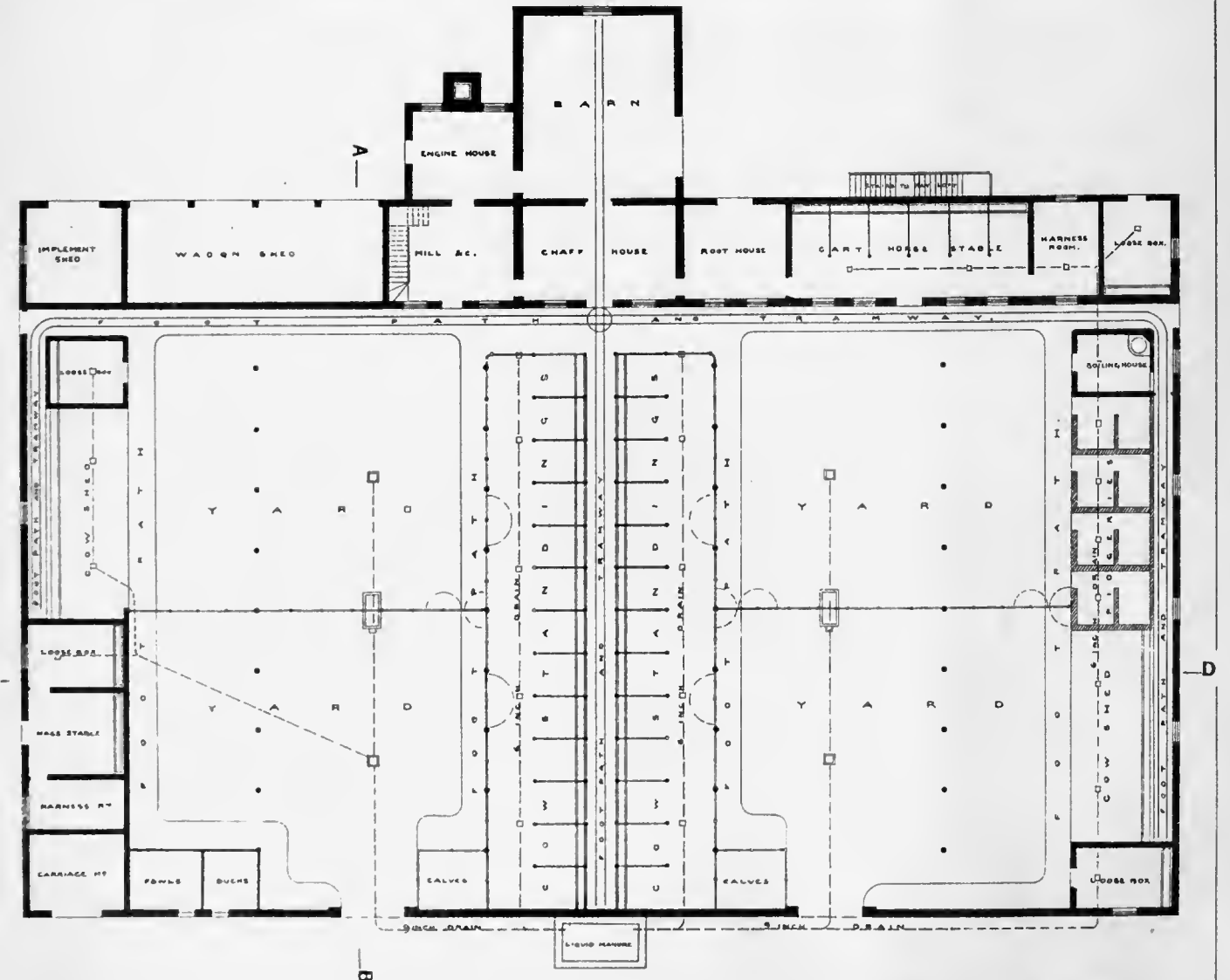
SCALE OF FEET

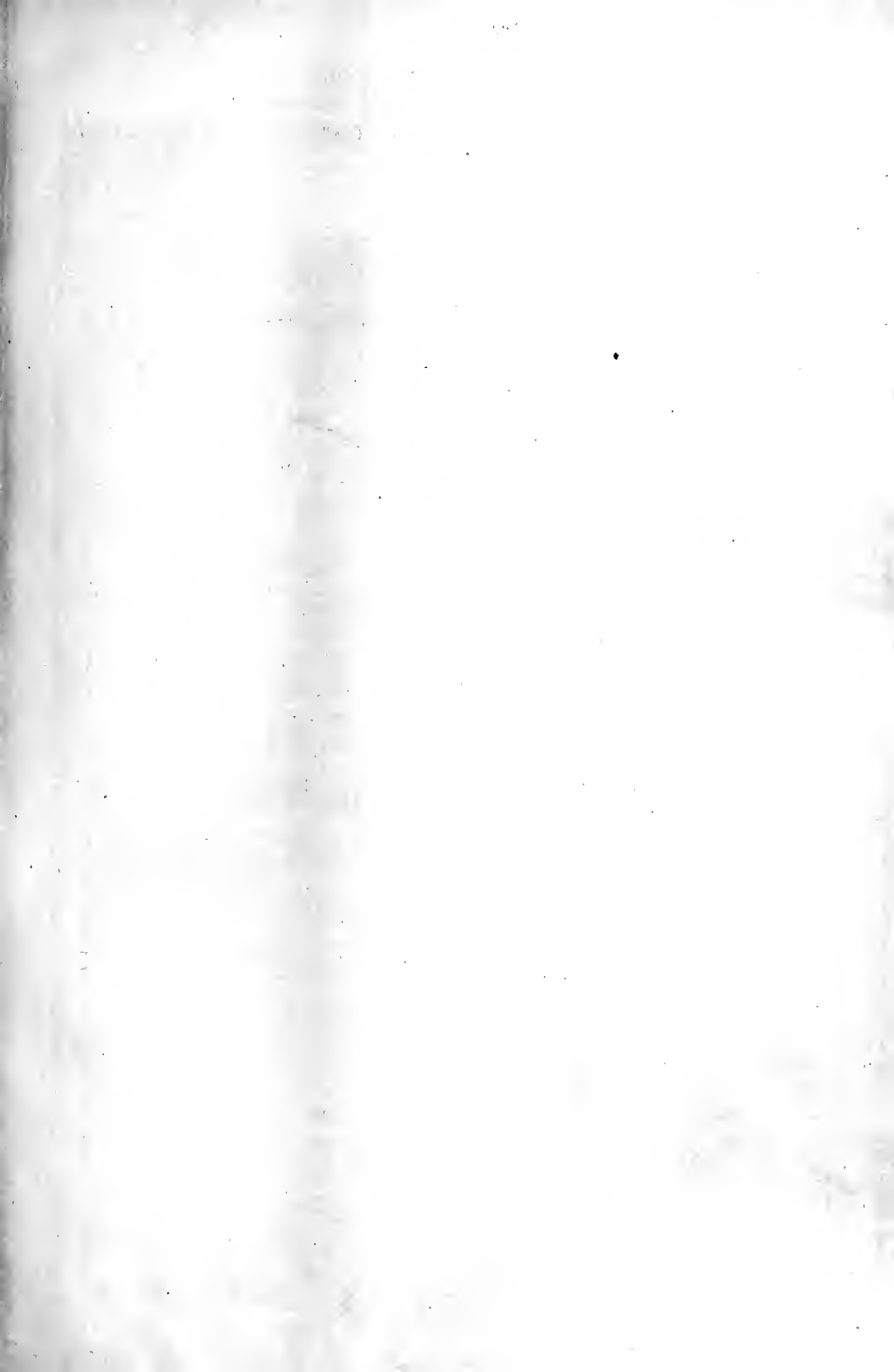


ELEVATION AND SECTION ON LINE A.B.

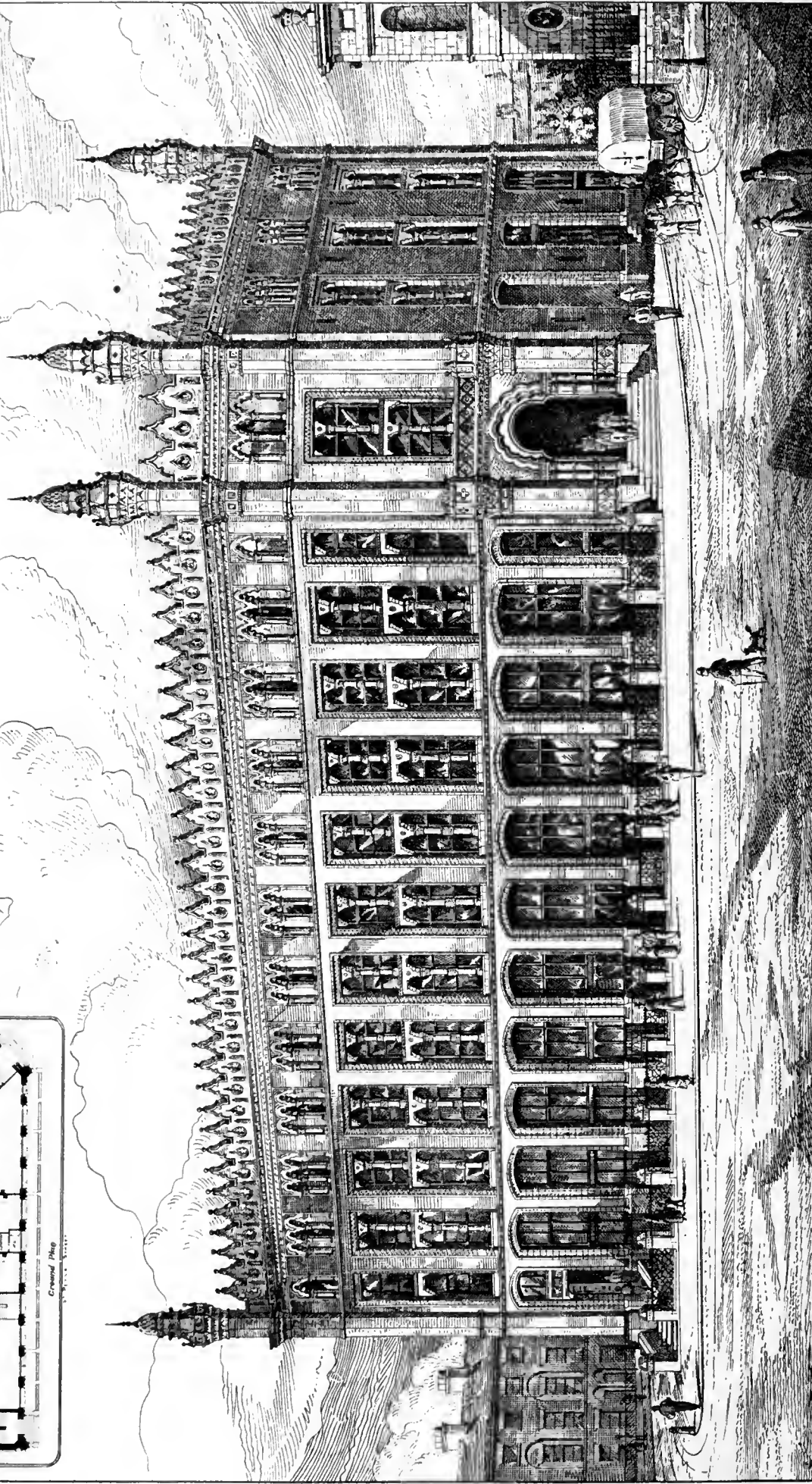
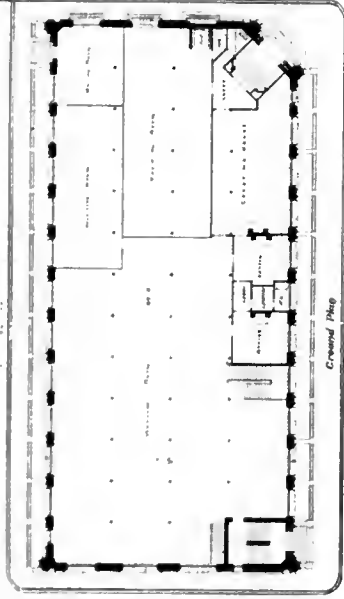


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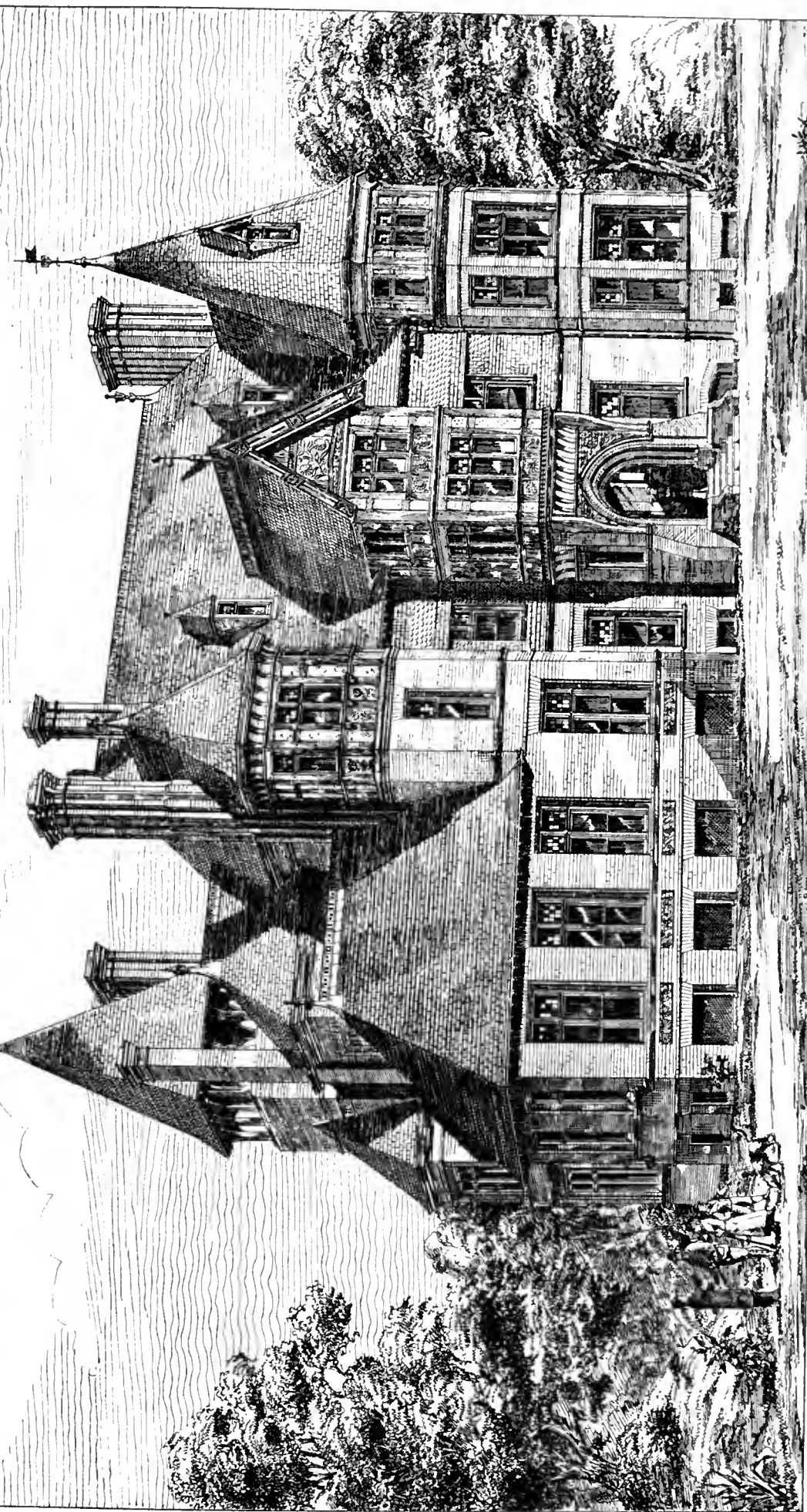
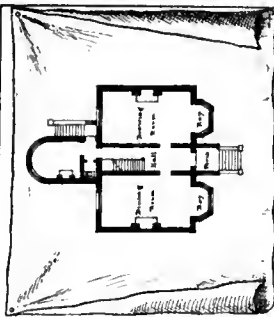
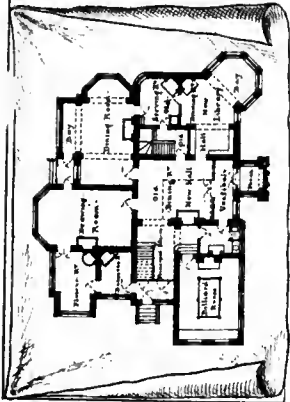




NEW CLOTHING MANUFACTORY & WAREHOUSE
FOR MESSRS BARRAN AND SONS S. PAUL ST. LEEDS
THOMAS TWYBLER ARCHT

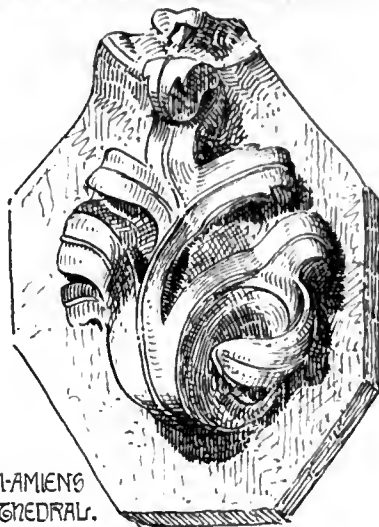


House at Surbiton Additions by Rowland Plumble ARCHT

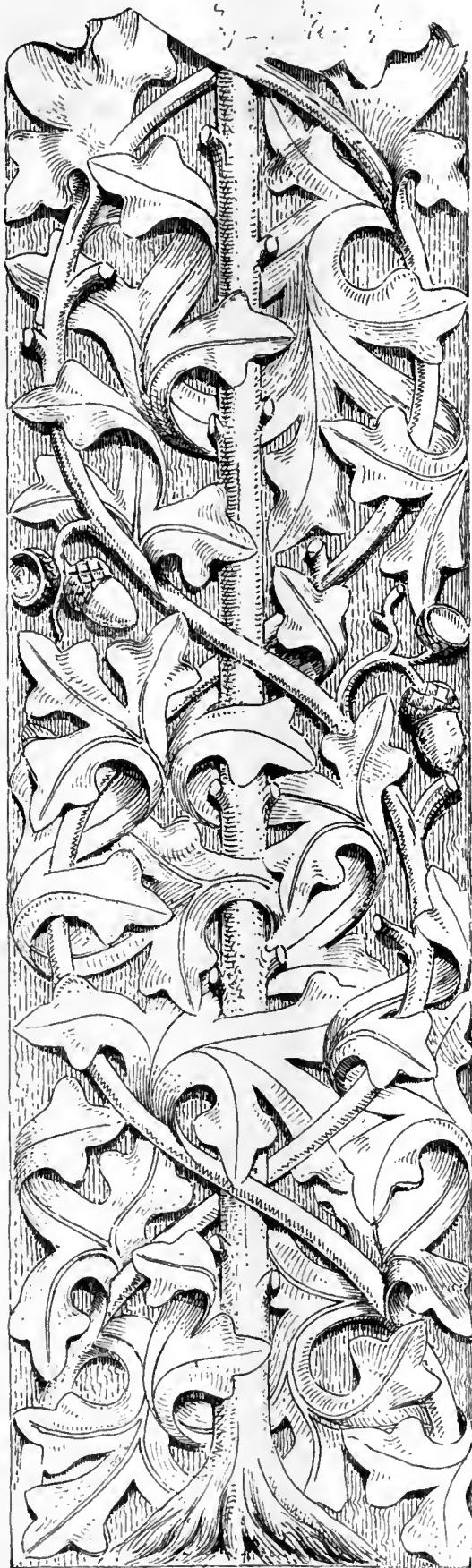


ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB.

PANELS &c WITH FOLIAGE.



FROM AMIENS
CATHEDRAL.



2: 5 3/4

FROM AMIENS CATHEDRAL.



12 1/2

PANEL NO. 128. IN THE R.A.M. CATALOGUE.
J. Frost. Remington. del. Nov. 1878.

ST. ALBAN'S CATHEDRAL.

THE controversy regarding the roof of St. Alban's has already reached the quarterlies. The *British Quarterly Review* has an article, in which Mr. Neale's book is taken as a text for a sermon on "Restorations." Everybody is preached it, all round, pretty vigorously except Mr. Neale himself, who is declared to be the "one gentleman" who "has proved himself to be exceptionally qualified" "for the guardianship of this great church."

If the author of the article is the architect whose initials appear on the illustrations which accompany it, we have yet to learn why his professional brethren are so ruthlessly assailed. Certain it is architects are only less roughly handled than the clergy. The latter—"mere sciolists, and mostly ignorant"—have patronised "the wholesale manufacturing men of business," and the result has been the ruin (the restoration that is) of all the "historic monuments" (the parish churches and cathedrals). Sir Gilbert Scott is once more attacked, and two illustrations and several pages of matter are devoted to an exposure of some of his real or supposed mistakes. Mr. Beresford Hope is an "intrepid physiologist" who has proclaimed "with comical presumption his peculiar architectural ignorance," while Sir Edmund Beckett is "meddling with other people's business" in endeavouring to substitute "modern vamping" for the original work of John De Cella at St. Alban's. Yet a little further on the Society of Antiquaries is snubbed for its opposition to the proposed high-pitched roof, which is declared to be "perfectly legitimate," although in its execution "no 'architect' should be allowed to deface the church with his professional designs."

A dissertation on the sin of "modern ritual display" seems to have been dovetailed into the article to keep up the Dissenting character of the *British Quarterly*, and we are treated to a new and original explanation of the causes which induced its author to frame the Mosaic ritual. Moses, it seems, had solely in view the improvement of Jewish agriculture by means of the system of first fruits and sacrifices. Anglican ritualism, whatever its merits or demerits, is probably little likely to benefit British beef, and so commends itself badly to an Evangelical Englishman.

After a good deal about the Parthenon, the Elgin marbles, and St. Paul's Cathedral—which building, we are assured, "is mechanical," and if destroyed might probably be restored better than it was originally built—we come back to St. Alban's. Our only course at present is to let the abbey alone, first because "nature has garnished" its "unbadaled exterior walling," and next because we have neither architects nor workmen fit to undertake the work. It is admitted that the exterior of St. Alban's is "possibly decayed," but this "is no misfortune; it helps nature, and the church has thus acquired a genuine consecration." Gothic works, indeed, seem to have been specially designed with a view to their eventually becoming picturesque "ruins;" so great at any rate is the admiration of the *Reviewer* for such remains that it doubtless seems hard that we cannot spare St. Alban's Cathedral yet awhile. Rievaulx and Fountains, and other similar relics of a dead religious system may still be left to the more or less careful guardianship of their owners, and to lovers of ruins who hold picnics within their precincts; but St. Alban's Cathedral, as the mother church of a new diocese, has, we trust, a long life of usefulness before it, and can yet command the services of true architects and artists to fit it for its purpose, who will do their work much, after all, as their mediæval predecessors did theirs, studying first use, and then beauty, or rather making use and beauty go hand-in-hand, unfettered on the one hand by a blind regard for mere decrepitude and decay, because they are old, but on the other hand reverently preserving for future use as living parts of the building—not mere "ruins"—the remains of the works of architects who, for all we know, had the good fortune to be allowed to do their work in peace, undisturbed either by meddlesome or ignorant amateurs.

Nowadays a minimum of knowledge is almost invariably eponymous—this is the *British Quarterly Reviewer's* pet word—with a desire to exhibit it, and thus disputes as to what is best

to be done between men who know their work, which we have said before are perfectly legitimate, and to be desired rather than suppressed, are joined in by people who can do little beyond echoing phrases and opinions they do not understand.

During the judicial examination of a certain unhappy nobleman, now languishing, &c., it was urged by some sympathising friends that he had for so long a time tutored himself to believe that he was entitled to certain property and estates that in the end he thoroughly and honestly considered himself the rightful heir, the lie having seemingly merged into truth simply from reiteration; and so it is, to my mind, with certain persons now hotly discussing questions relating to St. Alban's Cathedral. Interested architects, spurious critics, bombastic amateurs, and Pickwickian antiquaries have for so long a time reiterated that the decay of St. Alban's Abbey would be nothing short of a national calamity that persons possessed of more money than brains have gradually arrived at that conclusion. Many have gallantly fought on paper, and many, having left the fighting to others, have provided the cash to prevent the consummation of so dire a catastrophe. This idea has been further enlarged by Mr. Neale, who, with a patience and a skill much to be admired, has occupied time on an ambitious undertaking, which time might have been employed in securing to us an equally clever record of a far better example of architectural art.

I think, sir, that were an architect imbued with the greatest possible love for art, regardless of whether to the 12th or to the 19th century it owed its origin, and without preconceived ideas as to restoration, to visit St. Alban's Cathedral to-morrow, he might find the following not an untruthful description of its present condition.

St. Alban's Cathedral is a conglomeration of the various styles of architecture which prevailed from the Anglo-Roman period down to the Victorian era, and, with one or two exceptions, they happen to be the very worst representations of the very worst periods of the respective styles, regarded either from an art or from a constructive point of view. The exterior presents one of the most forlorn and wretched examples of ecclesiastical architecture perhaps existing. The brick walls grin in their nakedness and in their shame, clearly showing that the worst of mediæval jerry builders intended to cover them with plaster, but the gods maybe arrested them in the act of their artfulness, and cut them off as such men usually are, or should be, when endeavouring to hide their unskilful work. The windows generally contain the weakest of tracery, the poorest of mouldings, the worst of proportion. To proceed from the detail to the mass, we find an overwhelming brick tower, an elongated shabby-looking nave, with fenestration of the most abject type, and a diabolically monotonous skyline. The interior contains a very beautiful screen, a patchwork shrine, a sad medley of meretricious architecture, an uninterestingly long and ill-proportioned nave, more bad construction, more weak mouldings, flat ceilings of wood—some horizontal, some intended to be—all smeared with pigments, relieved by stencilled monograms unworthy of the lowest music-hall—an ill-begotten accumulation run up by ill-begotten outsiders; and then we are to be told as Mr. J. P. Seddon tells us, that all this is "unique for sheer simplicity of design." Well, so is the architecture of Gower-street "unique," and from the same cause; but even Gower-street has decent brickwork. Who talks, though, of spending thousands of pounds to preserve to posterity the architecture of Gower-street because it is "unique for simplicity of design?" Who talks of putting a high-pitched roof to the Gower-street houses so as to double the monotony of their sky line? But the thing could be done! Get a wealthy resident, with plenty of impudence, and (because he has mixed with a more or less practical builder, and meddled now and then with architecture) with plenty of asseveration that he knows more than all the London architects put together—get him to write a few letters to the *Times* repeating the asseverations, and then let him tell the public that the best thing to be done to Gower-street is to turn out the

residents, stop the traffic, make a schedule of dilapidations, put on a high-pitched roof, subscribe five thousand pounds to the fund, and proceed. Call in an architect with 5 per cent. on the transaction looming in the distance—call in a few old women antiquaries to swear that what is proposed will earn the gratification of an enlightened posterity—that it will make future architects acquainted with the "unique simplicity of design" of the latter part of the eighteenth century, and the thing is done.

Let us, however, for a moment assume that the architecture of St. Alban's was worth preserving, and consider the manner in which the so-called restoration has been carried out. Take the upper parts of the north-west and south-west portions of the walls of the nave. These were, I suppose, the portions which were so many feet or inches out of the perpendicular, and by a combination of theoretical and practical skill they have been set upright—the fact of their requiring this treatment being a little in favour of my assertion as to the unskilful workmanship pervading the Abbey. Well, we may say that the whole of these upper parts have been restored—that is, as a matter of fact, that all is entirely new except as regards the windows and blanks, one or two old voussoirs or arch stones, and as regards the ashlar work a few old pieces. In one case the whole of the head of a window is entirely new, except a stone in the cinque-foil tracery; in another the whole window is entirely new except the mitre or key-stone; in another a large superficial area of ashlar work is entirely new, except two or three stones. Now, what can be urged in favour of this very questionable mode of restoring a work? We may take it, I suppose, that some authority was found for the style and detail of the new work, and why was it not made complete and not injured in appearance—to say nothing of the possibility of decaying germs in the old work penetrating to the new)—by spots of decayed stone indicative of nothing so much as another early restoration, and an acquiescence in the fads of those Pickwickian antiquaries. I cannot conceive an architect spending the money of his clients in this way, when he must know that what he is doing will lead to another and a more or less immediate outlay. If the idea is to make work for an immediate posterity, well and good, but don't call it restoration.

To descend, sir, from such a lofty matter as restoration let us rest again on the upper part of the north-west portion of the nave wall, and consider the rain-water pipes, how they bend. There are three of them, and starting from the eaves they have the orthodox useless heads, then strange bends which cut right across the arch mouldings of the blanks, then the necessary junctions, and finally the straight lengths—one of the most unpractical and unsightly productions to be imagined. And who is responsible for this—the interesting amateur, the architect, the clerk of works, or Messrs. Macfarlane? But who can find it in his heart to grumble when such devotedness is indicated, such a commendable desire to inform the public is shown in the interior of the cathedral? I allude to the formal hacking-off of some of the plastering to show us the Roman brick, and in the case of an arch tympanum to show us berring-bone work. Oh! sir, the interesting female who points these little prettinesses out to visitors nearly shed tears when she proudly rested opposite them and described them, and waited for that responsive heart-beat, that reciprocal throb which she knew must come. I lifted up a prayer for the interesting amateur, and left. I was for once overcome. A sailor and myself formed "the party," and the poor fellow turned round, and when he returned I knew by the moist sleeve and the partially-dried eyes that he was affected as much as—

WM. WOODWARD.

THE NEW LAW COURTS.

THE eastern or Bell-yard block of the new Courts of Law is so nearly completed that the date of its occupation by the officials is only a question of a few days. Since Tuesday the hoarding has been removed from the Strand front, revealing an arcading of much beauty of detail. The arcade in front forms the outer

enclosure of the basement of the building. It consists of a series of clean-pointed stone arches, cinquefoiled internally, and richly moulded, resting upon coupled red Mansfield shafts, placed depthwise, with carved caps and bases, the latter resting upon a moulded plinth or dwarf wall. The wrought-iron railing filling in the opening arc is an exceedingly clever specimen of wrought work, the leafage on the standards and the treatment generally being very characteristic. The arches externally meet in gabled apices, the haunches of the arches being filled in with an open arcaded balustrading. When the stump of Temple-bar has been removed from in front a considerable accession of width will be gained in the Strand at this narrow point. Progress is also being made with the iron-work and canopy of the projecting clock now being erected by Mr. Benson, upon the face of the south-eastern tower. Entering by the archway through this tower, it is seen to be groined in alternate foot-wide courses of red bricks and Portland stone; the central space is filled by a trap-door of oak, foliated in iron. With the exception of a small gravelled drive the area within the railings is flagged, and at the Carey-street end are two flights of eight and nine steps respectively. The boarding has also been taken down on the Bell-yard and Carey-street frontages, which are enclosed by high railings, set on a stone base. The lamp standards are remarkably substantial, and, indeed, heavy in construction; the glazing is of plate glass with bevelled edges, and the faces are subdivided by bars meeting in a circle. The internal area is not so far advanced as that facing Bell-yard. The salient external features of the eastern block were remarked upon and criticised in the course of our descriptions during last year (pp. 519, 565, 584, Vol. XXXIV., p. 156, Vol. XXXV., published May 24, June 7, and August 16, 1878), and we can only in passing allude to the singular diversity in the slightly projecting bays, the massing and grouping, the capricious want of alignment and symmetry in the columniation and fenestration, and the quaint diapering and crisply stiff carving between windows. As the scheme develops the unexpected variations of design and the vigorous ornamentation reveal Mr. Street's characteristics the more distinctly. Entering the building we find fires burning in every room, and active preparations being made for occupation. The block is in five stories, and is planned with central corridor with rooms branching off on either side, communication being provided by staircases in eastern projecting bay of centre and near either end. There are also several lifts. The rooms are of varied dimensions (some of unusual proportions), and will be chiefly used as law offices, with store-rooms in the basement. We note that all the internal walls are plastered and finished with Keene's cement. The ceilings, both in corridors and rooms, are flat arches of Dennett's construction, the lower flanges of girders being often displayed. The centre of block is lighted through a well by a long skylight, framed wagonwise in wood with clear glass. There is also a window at either end, and small railed-in wells at intervals on each side of corridor. The stairs are guarded by open wrought-iron railing, with oak handrail, and at intervals a singular crook ending in a knob springs from the standards, suggesting the idea of a series of misplaced hat-pegs. The rooms are chiefly lighted by three-light windows, all square-headed, with massive stone jambs and mullions. The sashes are filled with plate glass. They are set in lead, with copper frames and trains, and slide very easily. The fireplaces are all open, and have heavily-moulded hoods, mantelpieces vigorously carved and treated with great variety. The jambs are filled with tile-patterns in four colours, supplied by Messrs. Garrad. The gas-fittings are uniform throughout the block, and have an almost archaic stiffness of outline. They depend J-fashion with up-carved ends, and are executed in polished brass, with wrought-iron scrollwork. Above the entrances to the chief rooms is an acutely-pointed hood-moulding. The doors in the principal room are of oak left unvarnished; in the other rooms they are of deal, painted in two neutral tints for styles and panels respectively—

in some portions of the block in chocolate and red, in others in two shades of sage-green or brown. The door fittings have been made for the contractors, Messrs. Bull and Sons, from the architect's designs, by Mr. Lever, of Maidenhead. The wrought-iron work throughout is by Messrs. Potter. The principal apartment, and certainly one of the most pleasing in the block, is the suitors' waiting-hall, situate on the "court level" at the south-eastern angle of the building. It is oblong in proportion, and opens from the corridors by an open arcade. Above, another arcade, also on two sides, converts a portion of the corridors on next floor into a gallery. These arcades are carried on stone circular shafts with square caps and abaci canted off at the angles, and served with bold First-Transitional foliage, each differing from the others. The roofing is of oak, boarded, with principals, purlins, and rafters displayed, and at the north-west angle of the room a portion of corbel of an external turret protrudes with piquant effect. The room is heated by a coil of pipes encased in interwoven cast-iron work case, like a mediæval chest, as well as by an open fireplace. Ample lavatory accommodation is provided on each floor; the fittings are by Jennings, of Lambeth.

Leaving this completed block, there is considerable progress to be seen to the westward in the main buildings. The stone cutting machinery and stone carvers have been steadily at work throughout the winter, and Messrs. Bull have a large quantity of material stacked on the ground, ready for use, as the weather permits. In the yard we remarked that the stones are numbered and lettered as they are dressed, and these figures are entered into a book, together with the places where they are stacked, so as to allow of easy finding by this key. Returning to the buildings it may be observed that the connecting blocks on the north and south fronts to the west of the Bell-yard block are nearly ready for roofing in, and the next block has almost attained its full height. The great central hall has been carried to the springing of the groining, and the ranges each of eleven buttresses on external side walls have received their copings. The narrow proportions of the hall in relation to its length and height are more apparent as the work proceeds. By the way, a comparison of dimensions with the apartment suggested by legal associations—Westminster—shows that, whereas the hall in the new Palace of Justice exceeds the more ancient one by 2ft. in length, it falls short in width by 18ft.—the accepted measurement of Westminster Hall being 228ft. long by 66ft. wide. The window and wall shafts as fixed are of Portland, but others of red Mansfield, granite, and Purbeck are to be added. The windows are set in pairs in nine bays, and will be filled with tracery. This hall will be approached by groined corridors, now nearly complete, leading to decagonal and circular flights of stairs—six in number—each with an internal staircase for officials within the newel. All the stonework for the hall is prepared in readiness for setting. The range of offices on the Carey-street front have advanced to the third story, and the work generally throughout the vast area is in steady progress, as indeed ought to be the case, seeing that from a thousand to twelve hundred men are constantly employed on the works.

THE STATE OF TRADE AND THE LABOUR MARKET.

TWO very significant sheets of statistics are now before us, prepared under the auspices of the National Association of Master Builders of Great Britain, which speak for themselves. One is a tabular "Statement of the State of Trade and the Labour Market" to January 1, 1879; the other, a "Comparative Statement showing the hours worked per week and the rate of wages per hour in the various Branches of the Building Trade" in the leading towns. Of course, we take them with a certain reserve, for they represent chiefly the masters' account, though we have no reason to doubt they fairly exhibit the state of trade, and the rate of wages in the several towns mentioned, for it will be admitted that master

builders are in a good position to obtain accurate information on such points. In casting our eye down the column "Supply of Labour," we find it to be generally stated as "plentiful" or abundant, while in a few towns, as Birmingham and Dudley, it is described as being "greatly in excess of demand." This is a significant and unfavourable sign, if we can place any reliance upon the masters' view of the matter, which may be somewhat exaggerated, and must be taken with a due amount of caution. At the same time we believe at the present crisis it is fairly representative of the labour market. If we inquire more into detail of the state of trade in particular towns we find the average condition to be slack or depressed. At Aberdeen it is "fair, but prospects not bright;" Ashton-under-Lyne, "quiet;" Birmingham, "very bad;" Bradford, "bad;" Bristol, "very slack;" Barnsley, "bad;" Blackburn, "slack;" Chatham, "dull;" Edinburgh, "very depressed;" Liverpool, "very bad;" Leith, "fair;" Leeds, "depressed;" Manchester, "slack;" Nottingham, "slack;" Oxford, "dull;" Portsmouth, "good;" Southampton, "very slack;" South Shields, "quiet;" Wolverhampton, "very bad;" Wigan, "slack;" and York, "bad;" and these represent the general tenor of the replies. If we further inquire in what branch of trade these remarks are intended to apply we find in every case the portentous adverb, "all" affixed with a few exceptions. Thus in a few places plumbers, plasterers, carpenters, and joiners have a fair amount of work. Referring to another column, in which alterations in the rate of wages and hours of labour are recorded, we find that at Birmingham a notice to all branches is given to increase three hours per week in summer, and overtime to commence one hour later. The operatives have given a counter notice to resist increase of hours and to make demand for increase of pay for overtime. At Bradford employers have given notice to masons and bricklayers to pay 8d. per hour all the year round, the pay coming into operation on June 2, 1879; to carpenters and joiners for a reduction of ¼d. per hour; to plasterers to pay by the hour and ¼d. less, and also to labourers. At Bristol the employers have given a six-months' notice to all skilled trades of a reduction of ¼d. per hour. At Bolton 1d. per hour reduction and increase of one hour in time is contemplated; at Blackburn most of the trades are required to increase the hours to 54 in summer; and similar notices have been given at Chorley, Derby, Doncaster, Inverness, Liverpool, Lincoln, Leeds, St. Helen's, Wolverhampton, Warrington, and other places. In London we find the only branch in which labour is not abundant is that of plasterers. Comparing the hours worked per week and the rate of wages we may take a few representative towns. These are classified under the several trades, summer and winter hours, and wages. Taking Bradford, we find the hours worked by masons per week in summer time are 49½, and the rate of wages 35s. per week; in winter the hours worked are 46, and the rate of wages 33s. per week. The same rates are recorded for bricklayers. For carpenters and joiners the hours are 49½ both summer and winter, and the rate of wages 8d. per hour. For plasterers the working hours are 49½ in summer and 47 in winter, the wages being 33s. per week. At Birmingham the masons work 54 hours per week in summer and 50½ in winter; the rate of wages is 9d. per hour. The same hours apply to bricklayers, carpenters, and plasterers, the wage being in all three cases 8½d. per hour. With slaters it is by piece work. At Coventry masons work 56½ hours in summer and 51 in winter, and are paid at the rate of 8d. per hour; bricklayers work the same, at 7½d.; carpenters the same, at 7½d. in the summer and 8d. in winter; and plasterers the same, at 7½d. At Liverpool the hours worked are 49½ in summer and 47 in winter for masons, and they earn 9d. per hour; bricklayers work 55 and 47½ hours respectively, and earn 9d.; carpenters and joiners, 55 hours, and earn 8½d. In London the following is the return:—For masons, 52½ hours summer, 48 hours winter, earning 9d. per hour; bricklayers—the hours are 52½ and 48 respectively, and the wage 9d.; carpenters and joiners—52½ hours all the year round, at 9d.; plasterers—52½ and 48 hours, at

9d., and slaters the same. Taking a southern town—Southampton—we find the return for masons is 56½ hours all the year—the rate of wages 7d. per hour; for bricklayers it is 56½ and 54 hours, at 6½ to 7d. per hour; for carpenters and joiners it is 56½ hours all the year, and the wage 7d.—remarkably low rates of wages, though at Winchester it is even less, being 5½d. per hour for carpenters and joiners, and the hours 58½. At Sheffield there has been a building trade dispute for some time past, but there is no return made in the tabulations. We hear that lately the masons received a four days' notice for a reduction of 1d. per hour for banker hands or cutters, and 1½d. per hour reduction for wallers. Previous to this the masons' wages were 9d. per hour for the whole year. We leave these facts to tell their own tale, and we trust the workmen will profit by the experience of the last few months, and endeavour by a timely action to check the increase of foreign competition that is now seriously threatening them. The matter will rest with them chiefly.

BUILDERS' IRONMONGERY—WHERE IS THE TRADE GOING TO?

"A WILLENHALL locksmith once assured us" (says the *Echo*) "that in some of the workshops in his town, where the cheap rubbish was made for the use of speculative builders, if a workman dropped a lock as he was fitting it together he never stopped to pick it up, as he could make another in less time. That this slipshod style of manufacture is at length bringing about the inevitable result—loss of business—is evident from a letter written to a morning paper by Col. Wrottesley, founded upon a report made for him by Mr. James Hill, of 37a, Upper Thames-street, London, a large contractor for locks to the War Department. Mr. Hill, who used to have all his locks made at Willenhall, now sends the bulk of his orders to America, so that at the present time our Government buildings—barracks, military hospitals, &c.—are being fitted with locks made in the United States, better and at lower prices than the British manufacturer can produce them. Mr. Hill carefully investigated matters for himself during a visit to the United States before making the alteration referred to, and the causes he assigns for the fact of American productions being cheaper and better than those made in this country deserve careful attention, both from masters and men. In the first place, the Americans employ machinery much more largely than we do; secondly, both masters and men on the other side of the Atlantic are better educated, both generally and technically; thirdly, the men work longer hours; fourthly, there is less drunkenness there than here; and, fifthly, there are fewer "garret masters," the larger number of concerns being limited manufacturing companies with sufficient capital to command brains and to make experiments, which small masters in the Midland Counties, working from hand to mouth, cannot do. There is, indeed, one cause—and apparently one alone—of the present depression with regard to English locks which is creditable to us as a nation, and that is due to the action of the School Boards, which have most properly compelled the attendance at school of the boys and girls who have hitherto been the human machinery of the English lockmakers. Mere children, who could hardly stand or walk—many of them, in fact, had to be strapped to the benches—were formerly employed in the shops; but during the last few years lads and men have had to be substituted, prices have risen in consequence, and this has helped the Americans to undersell us in our own and our colonial markets. As it is with locks, so Mr. Hill declares it is with watches, guns, and tools. The instances given by him of American superiority with regard to mechanical production generally appear to be reliable, and are certainly ominous of the speedy loss of our old manufacturing reputation, unless the lesson they teach is seriously taken to heart."

We have ourselves seen the locks to which the *Echo* alludes, and with the appearance of which our readers are familiar. They are undoubtedly superior to many English locks, of

the same value, in finish, accuracy of the working parts, and quality of material. There is no reason, however, why British locks should not be made to equal them in every respect, and we consider that Mr. Hill deserves well of English manufacturers for the attention he has given to the matter.

ARCHÆOLOGICAL & ARCHITECTURAL SOCIETIES.

LEEDS ARCHITECTURAL ASSOCIATION.—Mr. B. H. Thwaite, of Bolton, read a paper before the Leeds Architectural Association, on Thursday week, on "Structures Capable of Resisting Fires." In his remarks, he said it was surprising with what indifference the question of making buildings fire-resisting was viewed by the profession and the public. The first question generally asked after the intimation of the existence of a fire was as to whether the building was insured, and if the answer was in the affirmative sympathy was rarely expressed. People invariably consoled themselves when erecting buildings non-fire-resisting (to save a little extra expense) with the fact that for a trifle the building could be insured. Now the subject was too serious to be treated with such nonchalance, and was even worthy the attention of the legislature, when it was considered that every building destroyed by the ravaging element represented so much labour (and occasionally lives) irrevocably lost to the nation. On an average the property annually destroyed capitalised equalled three-quarters of a million sterling, equivalent to the annual labour of 10,000 skilled artisans and labourers. This fact alone should influence architects as to the importance of impressing on their clients the desirability of erecting fire-resisting structures.

SOCIETY OF BIBLICAL ARCHEOLOGY.—The annual meeting of this society was held at 9, Conduit-street, W., on Tuesday week, the Rev. Canon Beechey in the chair. The report for the past year commenced with obituary notices of the late secretary (Mr. W. R. Cooper), Mr. Joseph Bonomi, Professor Charles Seager, the Hon. C. W. Goodwin, and others. 90 new members were enrolled during the year, making a total of 539. The total receipts, including £123 from the sale of "Transactions," were over £725, and the expenditure, £572, leaving a balance of £153. The report having been adopted, a communication from Dr. Jules Oppert, professor of Assyriology at Paris, upon the Babylonian contract tables, was read by Mr. W. H. Rylands. The digest of the paper was the difference between the "contract tables"—a large special class of cuneiform documents—of Babylonia and Assyria. The latter are of a far less technical character, as befitting a more practical and not so litigious a people. They are, for the most part, written after an almost stereotyped formula, so that to know the legal form of one perfectly is to know all. On the contrary, no two of those written in Babylonia are framed exactly on the same legal model. Moreover, although the words and sentences are no more difficult to render than those composed in the sister dialect of Assyria, the whole is of so lawyer-like a cast as to make the meaning exceedingly obscure. Professor Oppert illustrated his distinctions by translating and commenting on a couple of Babylonian contract tables hitherto unpublished—one the property of a private gentleman at Paris, and the other in the Louvre collection. Both belong, like great numbers in the British Museum, to the archives of the great Babylonian banking firm of the Egibi family, the Fuggers or Rothschilds of that city, from Nebuchadnezzar's reign till late into Persian times. The former of the two relates to the sale of a field yielding five-sixths of a hemicorion (about 26 gallons) of corn for two mine, one drachma (say, £1 7s.). It bears date from the city of Bit-Aburim, on the 4th of Tisri, in the first year of the reign of Nabonidus, King of Babylon. The second is the succession settlement of a deceased bankrupt, a composition of three mine, seven drachmas, being accepted by the creditor for seven mine. It is dated at Babylon, on the 16th of Elul, in the third year of Cambyse, King of Nations.

Building Intelligence.

CASTLE-FFROME.—Castle-Ffrome church, Herefordshire, is about to be reopened, after restoration under the direction of Mr. Martin Buckle, architect, of Great Malvern—Mr. William Porter, of Malvern Wells, being the contractor. The tower, spire, and porch were found to be in a most dilapidated condition, and have been entirely renewed, the old lines of the former half-timbered ones being strictly adhered to. The roof also has been renewed and restored to its original pitch, and the old oak ceiling beams cleaned and repaired, and the panels filled in with pitch-pine boarding. A new vestry and heating chamber under have been added. The plaster has been taken off the inside, and the old Norman walls repointed. Encaustic tiles have been laid in the chancel, and the whole church has been recast throughout. This church contains one of the finest specimens of Early Norman fonts in existence, and which has carefully been preserved, and also some missing parts found during the restoration, in an old tomb, have been refixed.

DUNOANNON.—Some time ago a destructive fire reduced the premises of Messrs. Stevenson and Aiken, Church-street, Dungannon, to ruins. New shops and warehouses have been erected on the site, and the first portion of these was re-opened a fortnight since. The buildings cover an area of 90ft. in breadth by 120ft. deep. The first story of the street front is executed entirely with local white stone, partly dressed and polished, the spandrels and spaces being filled in with hammered stone. The upper portion of the front is supported on stone piers, with engaged shafts and angles, having moulded bases, bands, and caps, continued through piers. The windows are square-headed, with moulded circular spandrels. The roofs are high pitched and covered with ornamental tiles, surmounted with wrought-iron finials; five dormers break into the chief slope. The shop sashes and doors are all executed in rich pitch-pine, moulded and varnished, the glass being polished British plate, protected by revolving shutters. The work has been carried out by Mr. William Gabbey, builder, Belfast, from designs supplied by Mr. William J. Gilliland, also of Belfast.

DUNSTER.—A new Wesleyan chapel and schoolroom were opened at Dunster, near Taunton, on the 26th ult. The buildings are Italian in character, and have been erected from the designs, and under the superintendence, of Mr. Shewbrooks, of Taunton. The fronts are faced with Williton stone laid in courses, with bases, pilasters, quoins, copings, and other dressings in London cement. The roofs are covered with slate with red cresting. The chapel internally is 31ft. by 26ft., and 30ft. high to centre of ceiling. It has sittings for 252 persons, having sloping backs and seats, and solid moulded pitch-pine ends. There is an apsidal chancel, 17ft. 6in. by 14ft., raised three steps above the general floor level, and at the end a wheel window 8ft. in diameter, filled with stained glass executed from the architect's drawings by Messrs. Fournere and Watson, of Plymouth. To left of chancel is choir chapel, and to the right the minister's vestry, 15ft. by 13ft., with boiler-house attached. On the right-hand side of chapel, with separate entrance, is the schoolroom, 33ft. by 13ft., above a room open to the chapel, thus serving a double purpose as class-room and gallery. The building contract has been carried out by Mr. Templeman, of Taunton, at a cost of £950.

FULBOURN.—The 21st annual report of the committee of visitors to the Cambridge-shire and Isle of Ely Pauper Asylum states that since 1876 the following works have been carried out at the asylum at Fulbourn, near Newmarket, under the superintendence of Mr. K. R. Rowe, asylum architect:—On the female side—a day and night infirmary, a laundry, patients' day-room, boundary wall and gates, general w.c.'s, general bathroom, corridor connecting with wards and infirmary, and others to female entrances on north and laundry dry-room, extension of east day-room on ground floor, and widening of front day-room and

sleeping-room over it. On the male side an infirmary and general w.c.'s. The cost has been about £8,000. During the present year a new dining-hall and recreation room will be built.

HANLEY.—The first of the new Board Schools erected by the Hanley School Board was opened on the 13th inst. These schools are in three departments, all on the ground floor, and the general plan is in the form of an inverted L. The boys' and girls' department form the head of the letter, and each comprise a main room 60ft. x 22ft., with three class-rooms 22ft. x 18ft., fitted with galleries for dual desks and sliding partitions. Externally the schools are executed wholly in brickwork and tiled roofs, and the style adopted is the Queen Anne type of a plain character. These schools provide for 754 children—namely, seat accommodation for 250 boys and 250 girls, and 254 infants on the St. basis. The cost of the buildings is £6 1s. 7d. per head; cost, with the site, £8 1s. 3d. per head, and the cost, including dual desks, furniture, architect's commission, and other expenses, £8 18s. 10d. per head. The works have been carried out by Mr. George Ellis, builder, of Hanley, under the superintendence of Mr. W. A. Keates, architect to the board.

LONDON SCHOOL BOARD.—At Wednesday's meeting of this board the amended tender of Messrs. G. Ward and Son, of College-road, Dulwich, amounting to £5,978, was accepted for the erection of a school for 600 children in Salter's-hill, Lower Norwood. Various alterations were sanctioned in schools in Cottenham-road, Hornsey-road; Hughes's Fields and Canterbury-road, Deptford; and St. Paul's-road, Bow-common, at a total cost of £600. The appointment of Mr. A. Young, as assistant surveyor, was confirmed for 12 months; it was stated that this officer would then quit the service of the board, as he has entered into private practice. The works committee were authorised to nominate for appointment by the board an additional officer, whose duty it shall be to furnish estimates of the "provisions" in the tenders, and on the completion of the works to measure up all additions to, variations in, and omissions from the contract, and to settle the final accounts; such officer to rank as a principal clerk under the scale, at a commencing salary of £300 per annum. The same committee was authorised to make arrangements for the appointment of an additional clerk in the architect's department.

METROPOLITAN BOARD OF WORKS.—This board, on Friday, received a deputation from the St. Luke's Artisans' Dwelling Scheme Association, who presented a memorial on the subject of the Whitecross-street improvement scheme. The deputation represented that two years had passed since a scheme was commenced for the wretched and densely-peopled district, and that there appeared no prospect of progress, although isolated pieces of land had been acquired. It was stated by members that the blame did not rest with the board, but was due to the cumbrous provisions of the Act, which rendered it almost impracticable and very expensive. The memorial was referred to the works committee, and a hope was expressed that as the attention of Mr. Home Secretary Cross had been called to the defects in the Act some amendment would be made. Messrs Mowlem and Co. were instructed to re-lay and repair the stone tramway on Stratford-bridge at a cost of £590. The works committee submitted for approval of the board inscriptions to be placed on the pedestal of the Obelisk, as settled after consultation with Dr. Erasmus Wilson and Dr. Birch, of the British Museum. These were read and approved, and it was referred to the committee to carry them out at the entire cost of the board. The Plumstead District Board were informed—in reply to their letter, inquiring what steps the Metropolitan Board propose to take in order to prevent the pollution of the river Thames by the sewage at present cast into it, and urging the necessity of adopting some system of deodorising the sewage, and of utilising it in the cultivation of waste lands—that the board were not at present in a position to adopt the course suggested in their letter. It was decided to place a fire-escape on Shepherd's-bush Common, for the protection of the neighbour-

hood, and drawings prepared in the superintending architect's department were approved for a new fire-brigade station, to be built in Grove-street, Greenwich.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the **EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.** Cheques and Post-office Orders to be made payable to **J. PASSEMORE EDWARDS.**

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W. M. ABSTON, Glasgow, and **H. J. Badenoch**. (Mr. Rawlinson's "Suggestions," a notice of which we gave on the 3rd January, may be obtained of Knight and Co., 90, Fleet-street, Harrison and Sons, 59, Pall Mall, or Edward Stanford, 6, Charing-cross. The price is 3s. W. L. N. (We have found it answer well.)—J. L. (1. Write to B. T. Batsford, 52, High Holborn. 2. All particulars can be obtained from the respective secretaries. You will find those concerning the R.I.B.A. advertised in our own pages.)—J. M. BAYDON. (Next week.)

"BUILDING NEWS" DESIGNING CLUB.

LIST OF SUBJECTS.

1. A group of three cottages, two having 4 rooms and one having 6 rooms, with wash-houses and other offices to each. Style to be suited to a rural locality. Estimate to be based on 6d. a foot, cubic. Scale of drawings to be 6 feet to the inch.—2. A pulpit in stone, detached for a small and simple parish church. Inch scale, and details 1/2 full size.

DRAWINGS RECEIVED.—Ich Dien, In with Leeds, Cyprus, Nemro Burswell, "To be or Not to Be," "I New Year's Day," Signum, "Be to its Merits very Kind, &c.," W. G. M. in circle, J'espero, Ognore, Corvus, Try.

RECEIVED.—Arthur Marshall, W. W. Bond. (The rules were published in the **BUILDING NEWS** on Sept. 20th last, and you may obtain a copy by enclosing stamps to the publisher.)

Correspondence.

BELHAVEN CHURCH, GLASGOW.

To the Editor of the **BUILDING NEWS.**

SIR,—The remarks of your correspondents on the design for Belhaven Church appear to me to display a very superficial criticism. With exception of the two matters of the great altitude of the front and the standpoint of the perspective, there is really not any point of resemblance worthy of remark. The plans are altogether different—one is a large, the other a very small edifice. The management of the details in both the buttressing and windows and arcading is such as to make the artistic effect of the two something quite different. The monster buttresses and heavy pinnacles, the three large lights crushed between them, the centre pillar carved down to the lowest string, have the unfortunate effect of making the front, as a whole, a very heavy-looking affair, altogether lacking not only the rich design, but the graceful proportions of the several details in Mr. Shaw's design.—I am, &c.,

CRITIC No. 3.

PENMAENMAWR, OR BLUE WELSH STONE.

SIR,—Will you permit me, through your columns, to call the attention of borough engineers and town surveyors to a most disingenuous attempt to mislead them, which has been made by the Nevin Granite Company, Leadenhall-street, London?

About eighteen months ago I was desired to report upon the suitability of several classes of stone for paving purposes in the borough of Bradford. Amongst these happened to be some Penmaenmawr, or blue Welsh, respecting which great complaints had been made. A copy of my report the Nevin Granite Company have somehow obtained, and it appears to have occurred to them that it would be exceedingly smart were they to take a few words here and there from the report and put them together in such a fashion as to make me give a favourable account of a paving material I had distinctly condemned, and transfer this to the granite they supply. That they have done this deliberately, and with full knowledge of what they were doing, is apparent from the fact that they pass over half a page of my report condemnatory of the Penmaenmawr stone, and pick out the concluding half of a sentence, the beginning of which did not suit their purpose, and use it to give a false colour to the statistics which were appended to my report.

I append for the comparison of your readers that part of my report from which the quotations are taken, and the statement in the Nevin Company's circular. Such a mode as they have adopted of puffing their granite seems to me to merit strong condemnation. If official reports are to be tampered with in this manner for advertising purposes, injustice will be done to the reputation of those whose duties are already sufficiently arduous, and there will be no reliance to be placed upon even the most positive statements put forward by those interested in the supply of any particular material. I am quite aware that most firms are too honourable to condescend to so reprehensible a course of action as that taken by the Nevin Granite Company, but in order to aid the former in maintaining their position it is desirable that wrongdoers should, when detected, be exposed.

The following is the passage in my report:—

It is now upwards of twelve years since you commenced to pave with granites, and during that time five varieties of granite have been tried: they are—

- 1.—Penmaenmawr, or blue Welsh.
- 2.—Mountsorrel.
- 3.—Dalbeattie.
- 4.—Shap.
- 5.—Random.

No. 1 is the 3in. by 5 1/2in. Penmaenmawr, or blue Welsh Sett, as laid down in Thornton-road, Tyrral-street, and part of Market-street. This is by far the most durable stone of any in use here, but from its extreme hardness it is liable to become slippery, and terms an exceedingly dangerous pavement, and one not suitable for use as a paving material. Some of this stone has been laid down about twelve years, and I am unable to detect that it is yet worn to any appreciable degree.

I may, however, state that the quality of the Welsh granites laid down in Bradford is not that which is best adapted for paving purposes. A quantity of this granite, which was laid down for crossings a few years ago, has recently had to be taken up, and in the course of some correspondence with the company supplying it I was informed that the stone was supplied as channel runners—not as crossing stones. This must not be regarded as a fair sample of Welsh granite, for an abundant supply can be obtained out of the grey rock, equal to the Mountsorrel and Dalbeattie granite, both as respects security of foothold, cost, and durability. Large quantities of this grey granite are being used in Manchester and Liverpool, where it gives great satisfaction.

What the Nevin Company's circular makes of this is:—

The following extract from a special report upon the subject of granite paving, made by the borough surveyor of Bradford, Yorkshire, at the request of the Street and Drainage Committee, shows the relative value of Welsh granite as compared with some other descriptions used for paving in that borough. The surveyor's experiments and calculations are based on a period of 25 years and an area of 7,000 superficial yards. In reference to the Welsh granite he says: "An abundant supply can be obtained out of the grey rock, equal to Mountsorrel and Dalbeattie granite, both as respects security of foothold, cost, and durability. Large quantities of this grey granite are being used in Manchester and Liverpool, where it gives great satisfaction." The following table is the result of the experiments referred to:—

TABLE—Showing First Cost of the different kinds of Paving laid down in the Borough (exclusive of Foundations), with Repairs, Interest, &c., based on a period of 25 years, and an area of 7,000 superficial yards, in Manchester-road, from Tyrrel-street to Mill-lane.

MATERIALS.	First Life in Years.	Area in Superficial Yards.	First Cost.				1st Repairs, including waste.				1st Renewals.				2nd Repairs, including waste.				2nd Renewals.				3rd Repairs, including waste.				Interest at 4 per cent.	Total Cost at the end of 25 Years.						
			Price per Yard.	£	s.	d.	To end of Years.	Price per Yard.	£	s.	d.	To end of Years.	£	s.	d.	To end of Years.	£	s.	d.	To end of Years.	£	s.	d.	To end of 25 Years.										
YORKSHIRE SETTS	8	7000	4/11	1720	16	8	5	2/7	904	3	4	8	1720	16	8	13	004	3	4	16	1720	16	8	21	004	3	4	25	£	s.	d.	£	s.	d.
RANDOM GRANITE	10	7000	5/0	1750	0	0	5	2/	700	0	0	10	4750	0	0	15	700	0	0	20	1750	0	0	25	3990	0	0	10,640	0	0		
SHAP GRANITE ...	9	7000	9/6	3325	0	0	6	3/3	1137	10	0	9	3325	0	0	15	1137	10	0	18	3325	0	0	25	7703	10	0	19,953	10	0		
WELSH GRANITE ...	40	7000	11/0	3850	0	0	12	2/0	350	0	0	...	...	...	...	...	...	...	...	...	...	...	...	25	4032	0	0	8232	0	0
DALBEATTIE GRANITE ...	18	7000	10/6	3675	0	0	9	2/6	437	10	0	18	1599	6	1	...	...	...	...	...	...	...	...	25	3955	0	0	9666	16	1
MOUNTSORREL GRANITE ...	25	7000	12/0	4200	0	0	9	2/0	350	0	0	...	...	...	...	...	...	...	...	...	...	...	...	25	4424	0	0	8974	0	0

They give the following statistics, and say—

From this table it will be seen that Welsh granite sets, over an equal given area, last 15 years longer than Mountsorrel granite, and cost £742 less; 22 years longer than Dalbeattie granite, and costs £1,434 16s. 1d. less; 30 years longer than Random granite, and costs £2,408 less; 31 years longer than Shap granite, and costs £11,721 10s. less; 32 years longer than Yorkshire sets, and costs £4,455 less.

The Nevin Company thus appropriate to the grey granite the character for durability I had given to the Penmaenmawr or blue Welsh, and after I had said (on their own representation) that Welsh grey granite was equal in respect of security of foothold, cost, and durability to Mountsorrel and Dalbeattie, they make me give statistics showing that it is both cheaper and more durable than these. They may say that they find the words "Welsh granite" in the table, but the heading of the table which they quote states expressly that it refers to "the different kinds of paving laid down in the borough." I may here state that when my report was written not a single stone of grey granite had been used in Bradford, and on the page of the report from which they quote their introductory misleading half sentence, it is set forth with a prominence that precludes mistake, that the only Welsh stone laid down in Bradford was the Penmaenmawr or blue Welsh. The first sentence of the paragraph from which they take their quotation expressly calls attention to the fact.

The designation "Welsh granite," I may say, was used because the Penmaenmawr stone was known by that name to the Council and the public. The Nevin Company thus represent me as giving the preference to the material I have condemned.—I am, &c.,

JOHN ALLISON, A.I.C.E.

Borough Surveyor, Bradford.

January 10, 1879.

WOLLATON.

SIR,—May I ask for a few lines to acknowledge Mr. Warner's obliging communication about Smithson and Thorpe? I have looked in your pages, August, 1875, for the epitaph of the latter, but do not find it. Can he supply the reference to the page? Neither name nor that of the heading of this communication appears in the index in that half-year volume. Allow me also to ask his attention to the dates given by him of Smithson, who died in 1644, aged 79. He was born, therefore, in or about 1565. Hence, as the house was commenced in 1580, Smithson could only have been 15 years of age! The drawings to which Mr. Warner refers must have been subsequently drawn by Smithson; but could the design have been

made by him? It is curious that the record-room at Wollaton has no document giving the name of the architect-designer, who, as far as we yet know, must have been John Thorpe.—I am, &c.,

WYATT PAPWORTH.

ARCHITECT OR SURVEYOR.

SIR,—I am much gratified to find that I am not the only one who is cognisant of the malpractices of some quantity surveyors, acting in concert and collusion with architects and contractors—the latter being the medium or vehicle through which the disgraceful proceedings are so subtly managed as to baffle the scrutiny of clients, for there never was, I positively assert in the cases to which I refer, a more systematic conspiracy devised to filch money from the pockets of unsuspecting employers than the *trio conjuncto in uno*, spoken of have committed and consummated. Happily for the profession in particular, and society in general, such wrong-doers and base partisans are in the minority.

It is well for men of honour and integrity, and those of unswerving rectitude—and there are scores of such adorning the profession—that the black sheep be excluded from the fold, for "by their works ye shall know them." And in confirmation of the statement of "Old Builder," that in his experience he has discovered the fact "that great frauds are committed, and the helpless clients are kept in ignorance of the impositions saddled upon them by craftily manipulated accounts," I can adduce ample evidence.

With the exclusive object of putting employers on their guard as to their future requirements, and checking those who revel in their ignoble achievements, whilst miser-like they hug the gold they cannot count, beyond the tomb, I have had accorded me the favour of giving publicity in the columns of the BUILDING NEWS to the subject of the quantity surveyor and his percentages, and with that functionary I have associated both architect and contractor, because one is powerless and impotent to act without the other (if I mistake not, three is the licensed number of most vicious fraternities); but whether the architect shared "the spoil" with him in the case I alluded to in my last (whereby the quantity surveyor's aggregate commissions on one contract reached £3,500), I know not. But this I can affirm, that the architect employed him, and that the contractors benefitted in a large degree I can also show; otherwise they would not so readily concur in the quantity surveyor's making out their accounts. But how men, as high-class traders and contractors, having raised themselves to the highest pinnacle of

commercial greatness—having amassed colossal fortunes—can, regardless alike of principle or consequences, mix themselves up with, aid and abet, those plying their illicit trade, is an enigma I cannot solve! The exposé cannot imperil their business existence, but it may act as a deterrent in the future, and if they have consciences and read the BUILDING NEWS, it must make them hide their heads and blush with shame!—I am, &c.,

CONSTANT READER.

SIR,—The letter given in your issue of Jan. 10, 1879, and signed "An Old Builder," does not at all touch "Surveyors." The scandals he brings to light are in each case quoted of "architects" who take off their own quantities. As a provincial surveyor I must say that, whilst I know and deplore the existence of "quacks," both architects and surveyors, who work at any price for their client, and put it on in secret for quantities, &c., still I do not, and will not, believe that any general practice obtains of making such charges as "An Old Builder" mentions. It is high time that clients took care that their architect had nothing to do with the quantities. There is the safeguard—a responsible independent surveyor.—I am, &c.,

PROVINCIAL.

SIR,—I read on p. 688, last volume, last line of second column, and first six lines of third ditto, the following:—

A client engages an architect to prepare designs and drawings, and supervise his building, but he does not for a moment imagine that another 2½ per cent. comes out of his pocket for the preparation of the items or the document on which the builder bases his contract tender.

To this I say that "clients" must be very "green indeed" if they do not know it. They should ask and insist upon a bill of quantities being furnished to them, and they would find the last item to be, after the total is summed up, "surveyor's charges, — per cent., to be paid out of the first amount certified by the architect or engineer," as the case may be. I have seen scores of bills of quantities like this.

MEMBER OF CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

7, Westminster-chambers.

WELL-SINKING.

SIR,—Referring to the price quoted in your last issue, on p. 53, for well-digging in chalk—viz., 200ft. deep at 18s. per foot, without brick steining—allow me to inform you that in 1872 I had a well sunk, 3ft. in diameter, and 200ft. deep, for £51 17s. 9d. The price referred to above would amount to £185 8s., the only difference being that the diameter in the latter case is 4ft.—I am, &c.,

London, Jan. 1879.

W. EVE.

Intercommunication.

QUESTIONS.

[5635].—**Water.**—Will some one who knows give an idea of the rate per cent. on contract price paid by builders to water companies in some English centres, and oblige—A SCOTCH BUILDER?

[5636].—**Porous Bricks.**—Can any reader of the BUILDING NEWS inform me if there is a brick-making material to be had that is unusually porous? It would be required for sanitary purposes, and it is essential that water should pass through it under a little pressure, with moderate rapidity.—Z. X. Y.

[5637].—**Land Valuation.**—Would some of your correspondents state what would be a proper charge for valuing a homestead of 40 acres, with a small dwelling and outbuildings, the result being handed to the employer in a lump sum as the annual value, the property valued being a dozen or fourteen miles from the residence of the valuer?—L. H.

[5638].—**Concrete Columns.**—We are about to erect a covered service reservoir, where we intend to use cast-iron columns for support of superstructure, which will be brick arches on girders. The columns will be 11ft. high, and 9in. diameter at top, and 10in. at base. We think of filling the interior of columns with Portland cement concrete, to prevent the space being occupied by water. Can any one inform us, through the medium of your "Intercommunication" column, whether that is the best material for the purpose?—COCKER.

[5639].—**Quarries.**—**Colouring Plaster.**—Can any of your correspondents inform a reader in America where he can procure those small old-fashioned bull's-eye window panes? I recollect they were of a peculiar crystal colour, with a kind of bunch of glass in centre. I would like to know the address of parties where they are to be had, and the sorts and sizes of them. I would also like to inquire the method of colouring or tinting interior plastering to give a washable and non-absorbent surface?—AN INQUIRER, Cincinnati, Ohio.

[5640].—**Jointing Drains.**—Can any one explain why the jointing of drain-pipes in "clay" is considered so very objectionable? The town from which I write this has been re-drained on an expensive and efficient plan about 5 years ago, and the whole of the drains are laid with clay, both to the main drains and the junction drain to houses. It was not done here to save cost. It would have been perhaps cheaper to have done it in cement, as there is no clay in the country, and it had to be brought over 70 miles by rail.—B.

[5641].—**Flues.**—I note in the "Common-place Column" of last week, 9in. square is stated as the full size of a flue, or even 9in. diameter, if circular. Now, the Chimney Sweeps' Act stipulates that no flue shall be less than 9in. by 14in., and this is still in force, for a short time ago the Secretary of State drew the attention of all local authorities to this clause, and in many towns the corporations or local boards communicated with the builders and architects, requiring their attention to the matter. I should be glad to know how this regulation agrees with the general custom of building? I note, too, in Mr. B. H. Thwaites' paper on "Hygiene," that "24 square inches for sectional area of flue is ample." This would be under 9in. square.—B.

[5642].—**Defective Drains.**—Can any of your readers kindly tell me what is the best course to be taken under the present circumstances? In a provincial town a sewer runs under a certain house, in which a clergyman and large family are at present residing. It has often been remarked how very offensive the air is in the lower rooms of the house, especially in the mornings. The town authorities having been complained to, sent up their surveyor, who said that the private connections with the sewer were bad, and that the owner must have them looked at and made perfect. This was consequently done, according to the surveyor's suggestions. The nuisance, however, never disappeared, although not quite so bad. Lately, however, the air has been so impure that the basement floor was again excavated, and two large rat holes were found in the main sewers. The authorities have been again complained to, but without effect. Is there any higher authority that can act in these local matters if complaints are sent? There has been an unusual amount of sickness in the family, and the defective state of drains has doubtless been the cause. Any advice would greatly oblige—A SUBSCRIBER.

[5643].—**Clerical Dress in the Middle of Last Century.**—I possess the figure of a country parson, date about 1750, which I am anxious to restore correctly. He is of somewhat portly form, and wears (like the immortal Wesley is said to have done) "a long-tailed coat all buttoned down before." This has three buttons only, however, and the upper part opens, showing slightly the shirt beneath. Outside the coat, and around the waist, is a buckled leather strap. There are front pockets, with large lapetta thereto, in his coat skirts. He wears the long two-tailed collar common with the clergy when preaching 20 or 30 years ago. A little lower down than the belt, on both sides, is a button. He has knee-breeches and low shoes, with a water-tight tongue rising above each buckle. He carries his hat—a low-crowned and broad-rimmed one—under his right

arm, wears his hair long, has whiskers right round chin and cheeks, and the upper part of his head is covered by a skull-cap. The general costume is that of a Bluecoat boy. The figure, which is 2ft. high, and carved in elm, has stood for more than 100 years over the poor-box at St. Michael's Church, Pinhoe, Devonshire. Successive generations have decorated it apparently precisely as fancy suggested. Before returning it to its original position I should like to paint it correctly, and shall be obliged by suggestions thereon.—HARRY HEMS.

[5644].—**Concrete Arches.**—**Fireproof.**—Will some correspondent who has had some experience with the above kindly give his opinion on the following?—It is proposed to form a fireproof floor by constructing concrete arches (in lieu of brick) on iron girders, on the Deane's principle, thus: Span between girders, 7ft.; rise of arch, 7in.; thickness of concrete at haunch, 9in.; ditto at crown of arch, 6in.; boarded floor over; concrete composed of 1 of Portland cement to 2 of Thames ballast and 1 of sharp sand. May it be considered capable of sustaining a working load of 1½ cwt. per foot super and fireproof? Girders may be supposed capable of doing their part of the work.—NEWCASTLE.

REPLIES.

[5621].—**Strength of Timber.**—The following from "Harst" may perhaps be useful to "J. A. A." Beams, cross section rectangular, supported at both ends:—

b = breadth in inches.

d = depth in inches.

L = length in feet.

W = breaking weight in cwt.

Load in the middle: $W = C \frac{b d^3}{L^3}$

C being the weight in cwt. required to fracture a bar lin. square and 1ft. long.

$C = 60$ ash, English.

45 beech.

36 fir, white spruce.

48 Kauri pine, New Zealand.

35 larch, English.

50 oak, English.

40 pine, Northern, Dantzic, and Memel.

35 pine, Northern, Riga.

50 pine, pitch, American.

40 pine, red, American.

38 pine, white, American.

35 slate, Welsh.

Breaking weight according to mode of fixing.

Applicable to all Beams and Girders:

Beams supported at both ends and loaded in the middle = W .

Ditto supported at one end, and fixed at the other, the load on the middle = $W \times \frac{1}{2}$.

Ditto fixed at both ends, and loaded on the middle = $W \times \frac{1}{3}$.

Ditto fixed at one end, load on other end = W .

Beams in all cases will support double the load when distributed over the length that they would if placed on the middle.—STUD. INST. C.E.

[5630].—**Inscription.**—In reply to "A. B." the inverted commas denote abbreviations. Written at length, the first legend would run: "Cujus Animæ (æ) propit (t) ietur Deus" (To whose soul may God be mercifully disposed). The second—"Mutatis mutandi"—is similar. See Apocrypha II., Maccabees, xii., 44.—J. L. H. S.

[5639].—**Inscription.**—The formula on brasses and monuments means "God have mercy on his soul," and is taken from 2 Tim., i., 18. Thus, on the tomb of Bishop Isaac Barron, at St. Asaph, are these words: "O vos transuentes in Domum Domini, in Domum orationis, orate pro conservo vestro ut inveniat misericordiam in die Domini." He deceased in 1630.—MACKENZIE E. C. WALCOTT.

[5631].—**Sketching.**—First go to Durston Junction on the Great Western Railway, and from thence walk about two miles to Lyng, a small hamlet with an interesting church; then to Athelney, another two miles. Here is a ruined church on a mound; it looks tempting from the "line," but I never visited it. Next proceed to Langport, through Aller. At Langport is a very fine church, with some interesting old glass in good condition, and a small 15th-century chapel perched on a lofty gateway, which I guess to be of the 14th century. Hnish Church has interesting Norman work and a grand tower; and here I wish to direct attention to the rich colour of the Ham-hill stone, which is so much used in the churches and houses hereabout. It weathers splendidly, and acquires a covering of yellow and grey lichen, which is very charming. Near here is Muchelney, with its interesting abbey, ruins, church, cross, and cottages. Long Sutton has a fine church—restored, I am sorry to say, mercilessly—with remarkable rood screen and pulpit. From here to Martock, passing through Long Load and Stapleton. On entering the latter observe, first on the left and then on the right hand side of the road, two battered medieval sculptures built into the walls of some farm buildings. At Martock is a very noble church, principally of the 15th century, but with early 13th-century chancel; a picturesque street, with many good 16th and 17th century buildings, and a most interesting manor-house of the 13th century, almost intact. This should be measured and drawn to scale. Through Bower Hinton to South Petherton. On the bridge over

the Parrett, on the Fosse-way, are two stone effigies worth noticing. There is a local tradition relating to them. South Petherton Church is large and fine, with lofty octagon central tower, some interesting monuments, and a pair of very fine 15th-century brasses. In the town are a manor-house (15th century) and some 17th-century houses with good chimneys; and near is Wigborough Manor-house. On referring to the Ordnance map a group of villages will be seen to lie to the west of Petherton so near together that one is hardly well out of the first before the second is in sight, and so on to the last. Begin with the most northerly ones. Of this group I know that Kingsbury has a good church and a fine tower; Barrington, an interesting church with central octagon tower, and close by is a remarkably fine Tudor mansion (Barrington Court); Shepton Beauchamp has a fine church; Puckington, an interesting church with 17th-century chancel screen; Stocklinch, a small early cross church; Ilminster, a very fine church with interesting and fine brasses. I should then go to Hinton, St. George, and Crewkerne, and back through the villages of Haselbury, Chianock, Chiselborough, Norton, and Stoke. In Stoke are some monastic remains and an interesting church. Ascend Ham-hill for the very fine and extensive view; descend to Mountacute, a picturesque village with remains of priory, a magnificent Elizabethan mansion, and good 17th century cottages; then through Adcombe, Brympton, with fine manor-house, and Preston, to Yeovil. Here is a grand church, in which is a good 15th century lectern, on which observe the engraved half effigy of Martin Forrester, monk, and Latin verses. In Yeovil were also some houses worth sketching. Trent Church should be seen, and then another closely-packed group of villages lying beyond, in several of which I know are churches and other things worth seeing. Cadbury Camp lies in the way, and is worth walking over. Work now to the west through Lydford, Keaton, and East and West Charltons. In the latter are two interesting churches and an old rectory. Somerton may next be visited, where is a fine unrestored church with a singular octagon tower and an elaborately-carved oak roof. In the market-place are a curious butter-cross and some picturesque houses. Walk by the foot-paths across the fields by Littleton, where many Roman remains have been found, to Compton Dundon (from the Beacon-hill is a very fine view over Sedgemoor, &c.), through Street, to Glastonbury; from thence, if time will allow, Baltonsborough, Barton, St. David's, &c., might be explored. From Glastonbury go by rail to Wells, from thence to Shepton Mallet, back to Wells, on to Cheddar and Uxbridge, and through the villages between the last and Yatton, where at Yatton Junction the main line of the Great Western Railway will again be met with. I may just add I do not know all the places I have named, but I have seen most of them, and know them to be well worth visiting. I must also prepare the architect and archaeologist for some disappointment and disgust as he becomes acquainted with the slashing and thorough style of restoration in which the Somersetshire clergy seem to delight.—O. E. S.

LEGAL INTELLIGENCE.

ARCHITECTS AS ARBITRATORS BETWEEN THEIR CLIENTS AND THE CONTRACTORS.—In the Court of Appeal, on Monday, before Lord Justices James, Baggallay, and Bramwell, the case of Wood and Son v. the Bedwelly School Board was decided. This was an appeal by plaintiffs from the decision of Vice-Chancellor Malins, refusing on intervenutory motion an injunction restraining Mr. Blessey, the surveyor and architect of the board, from acting as arbitrator in the settlement of the amounts due to Messrs. Wood and Son under three contracts for building the George Town, Blackwood, and Earl-street schools respectively. The contracts contained the usual clause appointing the architect as arbitrator in cases of difference, but it was alleged that Mr. Blessey had, in the course of the transactions between the builders and the board, shown a bias which disqualified him from the discharge of the duties of that office. The appeal was dismissed, with costs.

PLASTERER v. MASON.—At Lambeth county court, last week, the case of Scudamore v. Hoborn was heard. Plaintiff is a plasterer, and defendant a builder and contractor, of 94, New Kent-road. The claim was for £10 16s. 3d., balance of contract. Plaintiff contracted, at £30 per house, to plaster and cement two houses in Barry-road, Peckham. The dispute turned on two items—for cementing pier caps in one of the houses, and fixing of springers to bay windows. After the contract had been entered on, stone was preferred to cement for one of the houses, and a mason was called in to do certain work. Plaintiff asserted that he performed other work in lieu of that the mason took from him. Judgment for plaintiff, for £8 16s. 3d.

The centre light of the eastern triplet in St. Peter's Church, Parkstone, Dorset, is being filled with stained glass in memory of the late Mr. John Parr. When completed with the side lights the subject will be "The Adoration of the Lamb." The artist is Mr. James Bell, of 98, Great Russell-street, Bloomsbury.

Our Office Table.

THE new edition of Street's "Indian and Colonial Mercantile Directory" is indispensable to all who are engaged in business transactions with the various places referred to in its pages. The list of these include India, Ceylon, China, Japan, the Eastern Archipelago, Java, the Philippine Islands, Australia, New Zealand, Tasmania, Fiji, South Africa, Canada, America, the West Indies, &c., and in each case the information given is well arranged, and is of the most comprehensive character. Various steam routes to the places treated of, with rates of fares and times of transit, are given, thus placing concisely before the public the different facilities offered by the several companies. Particulars of the various railways in operation or construction are also supplied where practicable. The London agents to each of the banks are named, so that a merchant is enabled to see to whom to apply where financial information or assistance is needed in connection with any particular town or city. The number of towns and cities represented has been slightly increased. An important feature is the insertion of maps of the various countries mentioned, in which the relative positions of the principal towns are clearly shown.

Our readers will regret to learn that Mr. E. M. Ward, R.A., who has been for some days dangerously ill at his residence, Osborne-villas, Windsor, died at ten o'clock on Wednesday night. Mr. Ward, who was the nephew on the mother's side of Horace and James Smith, the authors of "Rejected Addresses," was born at Pimlico in 1816. In 1834 he was admitted a student of the Academy, under the auspices of Wilkie. His first picture, a portrait of Mr. O. Smith as Don Quixote, was exhibited in 1834. He went to Rome in 1836, and remained there nearly three years. "Cimabue and Giotto" was the first picture exhibited on his return, but it was "Dr. Johnson reading the MS. of the Vicar of Wakefield," in 1843, that brought him into public notice. In 1847 Mr. Ward was elected A.R.A., and in 1855 R.A. He painted several of the frescoes in the corridors of the Houses of Parliament, among them being "The Landing of Charles II.," "The Acquittal of the Seven Bishops," "General Monk declaring for a Free Parliament," and "William and Mary Receiving the Lords and Commons." Among the many other paintings which made his name widely known were the celebrated "Last Sleep of Argyle," "The Execution of Montrose," in 1857-8; "The Emperor of the French Receiving the Order of the Garter" (painted for her Majesty); and "The Night of Rizzio's Murder." Mr. Ward married a granddaughter of the late Mr. James Ward, R.A. This lady is also well known as an artist, and has been since 1850 a frequent exhibitor at the Royal Academy.

To-day we give another drawing from the Exhibition of the Royal Academy last year, and it may be interesting to note that no less than

83 of the works in that collection will be found in our pages from the drawings there exhibited, which were only 140 in number, so that it will be seen that nearly two-thirds of the architectural works exhibited at last year's Royal Academy were published in the BUILDING NEWS.

THE Liverpool Engineering Society held the first meeting of the present year on Wednesday evening; Mr. Morgan E. Yeatman, M.A., President, occupying the chair. The chief business was the reading and discussion of the paper by Mr. J. S. Brodie, on "The Disposal of Town Refuse." The author considered that, in spite of the attention that has been paid to this all-important subject, and the sums of money that have been spent by various companies with greater or less results, the question as to how best to get rid of such refuse as that from dwellings, factories, and slaughter-houses, remains *in statu quo*. Natural water-courses being barred as receptacles for sewage matter, recourse had been had to other methods of disposing of it, and Mr. Brodie considered those that had been tried as (1), precipitation; (2), filtration; (3), irrigation. Under the first head Scott's lime and cement process was described, and a specimen of the cement was exhibited; Whittbread's and the celebrated A B C were also described; Weare's and Bailey Denton's methods of filtration came next. Passing over irrigation as an agricultural question, the author next described the Rochdale tub system and earth closets. In conclusion Mr. Brodie believed that unless something altogether unexpected came forward, towns would have to continue to pay to get rid of their refuse just as they have to pay for their water supply.

It is gratifying to know that the people of Birmingham, true to their reputation, intend at once to restore their Shakespeare Memorial Library which was destroyed by fire last Saturday. The *Echo*, in noticing the fact that while one Shakespeare memorial has disappeared under lamentable circumstances, another is rapidly approaching completion at Stratford-on-Avon, appropriately reminds the authorities of the latter town that it is their duty to accept the offer which has been made to them by Messrs. Merryweather and Co. to provide a hand-engine for use in case of fire in the Henley-street house. Both here and in New-place there are relics of the poet which could never be replaced, and a fire, unless checked at the very outset, would speedily dispose of such well-seasoned dwellings.

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CHIPS.

The District Board of Works for St. Saviour's, S.E., have accepted a tender, based on a schedule of prices, from Messrs. Hoare and Son for general sewer and drainage works.

New Sunday school buildings have been opened at Mildmay-park Wesleyan chapel, Stoke Newington. The schoolroom is behind the chapel, and is 77ft. by 30ft.; four class-rooms open into it by folding doors. The architect is Mr. Charles Bell, of London, and the builders are Messrs. Brown and Robinson. The cost has been £1,770.

The Town Council of Bath have appointed a committee to consider the desirability of erecting a public abattoir on the site of the old slaughter-houses in Boatstall-lane.

The Notts county magistrates, at the financial sessions held on Friday, decided to appoint a county surveyor, and appointed a committee to consider and report as to the salary to be attached to the office. From £100 to £500 a year was generally suggested.

The Vestry of Putney have obtained the sanction of the Local Government Board to a proposal to purchase premises at the corner of High-street and Disraeli-road, Putney, at a cost of £2,800, and converting the same into a vestry-hall and offices at a further cost of £700. A committee has since been appointed by the vestry to carry the scheme out.

The King of Portugal contemplates founding a society for the relief of artisans disabled by accidents, and the families of those artisans who have lost their lives by accidents.

A new Board school was opened at Hampstead by Sir C. Reed on Wednesday week. It is of the usual Queen Anne character, and accommodates 240 boys, 240 girls, and 350 infants.

The Bournemouth Improvement Commissioners have appointed Mr. Crickway, of Weymouth, as assistant engineer, to act in conjunction with Mr. C. C. Creeke in carrying out the sewerage works.

Works of water supply are about to be commenced for the local board of Walton, near Preston, under the superintendence of Mr. De Rance, C.E.

The Canterbury Town Council have resolved to request Mr. Rawlinson, C.E., to report—in conjunction with a gentleman acquainted with the agricultural and financial aspects of sewage utilisation—as to the disposal of the sewage of the city.

The Town Council of Hereford have submitted to an action for river pollution brought against them by the Wye Conservators, and acquiesced in an order made upon them to wholly divert the sewage from the river, within three years, by means of a sewage farm two miles east of the city.

Mr. Gordon Reab, who recently resigned the post of borough surveyor of Darlington on being appointed to a similar situation at Preston, was presented last week with a silver tea service by the officials connected with the Darlington Corporation.

A science and art exhibition was opened in the Grammar School, Bedford, on Thursday in last week. It is the first exhibition of the kind in the county, and is pronounced a success.

A stained-glass window has been recently erected at the west end of the parish church of Stoke Holy Cross, Norfolk. The subject is "Moses lifting up the Serpent from the Wilderness," by Messrs. Ward and Hughes, of Frith-street, Soho.

At a meeting of the parishioners of St. Philip's, Heigham, Norwich, held on New Year's Day, it was decided to endeavour to complete the tower and spire of the new church, built about seven years since. The sum required is about £2,000.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

The death is announced of M. Auguste Préault, the sculptor, a pupil of David of Angers, who has left many specimens of his talent in the churches, squares, and cemeteries of Paris.

The parish church of St. George, near Monkleigh, Great Torrington, has just had several additions made to it internally, under the supervision of Mr. W. R. Brydon, architect, of Bridgeland-street, Bideford. A parlous screen has been erected between the chancel and Annery aisle, by Mr. Harry Hems, of Exeter.

A new infirmary for the East Ashford Union was opened at Willesborough on Monday. The cost will be about £2,500. Mr. J. Gardner, of Folkestone, was the architect; Messrs. W. and T. Denne, of Upper Walmer, were the builders.

A school-church at Oxford has been opened. The work has been carried out by Mr. J. W. Rowland, of Southampton, from the design and under the superintendence of the architect, Mr. W. H. Mitchell, of Southampton. The room is 36ft. by 24ft.

In our notice last week of the opening of new board schools at St. Augustine's, Norwich, it was stated that Mr. G. E. Hawes, of Norwich, had supplied the boys' and girls' schools with his celebrated "locker deal desks." It should have been "locker deal desks." The desks are of birch not deal.

The whole of the sewers of the Dreadnought Seamen's Hospital, Greenwich, have been ventilated and properly trapped under the superintendence of Mr. Ernest Turner, of Regent-street, upon a plan approved by Mr. Robert Rawlinson, of the Local Government Board.

A new chapel erected by the Primitive Methodists of Wickersley has been opened. The chapel, which will accommodate between 250 and 300 worshippers has been erected by Mr. Henry Flowitt, of Doncaster, from designs which have been prepared by Messrs. Kerridge and Son, architects, of Wisbech, at a cost of about £1,000.

Two houses are about to be added to the Avenue block at the Albert Asylum, Cambridge. Mr. Swau is the contractor.

Works of sewerage are about to be carried out in the town of Halstead, North Essex, from the plans of Mr. J. Bailey Denton, C.E.

Works of sewerage are about to be carried out by the Holywell rural sanitary authority in the townships of Argoed and Bistre. The sewerage will be utilised by irrigation on lands at Spon-green and Nant Mawr, and the total cost of the scheme is estimated at £3,000.

The Wesleyan chapel, in Gold-street, Northampton, was reopened on Tuesday week after alterations from the designs of Mr. Newman, including the addition of an apse, domed, panelled and gilt, 24ft. deep, and containing choir stalls, and the substitution of pitch-pine seats for pews. The outlay has been £2,000. Mr. T. Cosford, of Northampton, was the builder.

A new cemetery was consecrated by the Bishop of Lichfield on Wednesday week at Brimington, near Chesterfield. The area is two acres, but five acres more can be brought into use. There are chapels for Episcopalians and Dissenters, connected together and surmounted by a turret. There is also a sexton's house. The total cost has been £4,500. Mr. Rawlinson, of Chesterfield, is the architect.

A sewerage scheme is to be prepared for Barton-under-Needwood by Mr. Walker, of Cannock, for the Barton-on-Trent rural sanitary authority.

A new reredos has been placed in the chancel of St. Mark's Church, Lincoln. It has been constructed from the designs of the Rev. F. Satten, of Brant Broughton.

The Bridlington Local Board have applied to the Local Government Board for permission to borrow the sum of £5,000 for carrying out works of sea defences on the North Cliff from Sand-cut to Sands-lane from the designs of Messrs. Clarke and Picknell, of Hull, to whom the first premium was awarded in the recent competition.

The Town Council of Inverness have resolved to apply for a provisional order for an extension of their borrowing powers under the Water and Gas Act, to the extent of £20,000 for water, and £15,000 for gas.

A contagious diseases hospital has been erected for the Eastbourne rural sanitary authority. Mr. G. A. Wallis was the architect, and Mr. Cornwall the contractor.

At the recent annual distribution of prizes and certificates at the Dundee School of Art Mr. D. S. Grubb, recently art master at Dundee, and now of Elgin, was presented with an inlaid walnut davenport as a token of the appreciation of his labours in Dundee.

The will of Mr. Frederick Pepps Cockerell, of 18, Manchester-square, late honorary secretary of the Royal Institute of British Architects, has been proved under £14,000 personality, and that of Sir Francis Grant, P.R.A., under £20,000.

The parish church of Ringshall, West Suffolk, was reopened on Wednesday, after restoration, from the designs of Mr. R. M. Phipson, of Ipswich and Norwich. Mr. R. Tooley, of Bury St. Edmund's, was the contractor. The outlay has been about £1,000.

Mr. Steed is commissioned to execute a monument of the late Princess Alice, Grand Duchess of Hesse-Darmstadt, which is to be set up in Whiphogham Church, Isle of Wight.

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. Discussion on papers by J. F. Hedley, on "Rating of Railways," and "Terminal Charges," 8 p.m.

"Society of Arts. Center Lecture No. V., on "Mathematical Instruments," by W. Matthew Williams; 8 p.m.

WEDNESDAY.—Society of Arts. Paper: "The Modern Science of Economics," by H. D. Macleod; 8 p.m.

THURSDAY.—Society for the Fine Arts, first conversazione.

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Trade News.

WAGES MOVEMENT.

MERTHYR.—In consequence of depression in trade the Merthyr builders have resolved to enforce a reduction in wages of 10 per cent.

AVR.—The proposed reduction of masons' wages by 4d. per hour dates from Monday last. The men, however, have intimated that they will resist the change.

SHEFFIELD.—The whole of the carpenters and joiners of Sheffield have received notice of a reduction of 1d. per hour, and after the 24th of June will be required to work four hours longer for a working week than at present. They have hitherto been getting 8 1/2d. per hour, and working 49 1/2 hours per week; but the masters have now issued notices of reduction to 7 1/2d. per hour, and also of an extension to 53 1/2 hours per week. The new rules, of which these proposed alterations form a part, contain several other proposals which are in great disfavour with the men, who intend to hold an aggregate meeting to protest against the action of the masters.

BANBURY.—The strike in the building trade at Banbury has terminated, the men having accepted the reduction of 1d. per hour.

BUXTON.—The differences between the builders and their workmen have been agreeably adjusted.

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TENDERS.

CHELSEA.—For works required in Pitching Clabon Mews, on the Cadogan and Hans-place Estate. Mr. W. Forbes F. Ashdown, surveyor:—

Mowlem and Co. (accepted) ... £742 10 0

DAREMTH.—For the erection of a mistress's residence and additions to school for the School Board for Darenth, under the superintendence of Mr. Wm. Eve, IO, Union-court, Old Broad-street:—

Blake £743

Page 670

Walter 656

Hill 590

Gumbrell 487

*Accepted subject to approval of the Education Department.

EDMONTON.—For hot and cold water pipes and fittings in the workhouse laundry, for the Edmonton Board of Guardians:—

Bushy and Co. £66 12 0

Sealey 36 9 0

Ellis 32 10 0

Brown 27 14 0

Grimley 26 9 0

Randall (accepted) 23 17 10

HAMPSTEAD.—Hare and Hounds Tavern, Hampstead. For cabinet and counter at the above:—

Trent Bros. £307 14 11

Everett and Son 345 7 0

Hill and Son (accepted) 329 0 0

ISLEWORTH.—For chapels, lodges, mortuary, and boundary walls at the new cemetery, Isleworth. Mr. Rovedino, architect; quantities supplied:—

Hobert £3,500

Harris and Bonell 7,290

Marriott 6,613

Hiscock 6,399

Taylor 6,133

Stephenson 5,887

Beauchamp 5,767

Parker and Evans 5,621

Blasby 5,294

Dorey (accepted) 5,294

LANCASHIRE.—For water mains for the Adlington district, for the Local Board of Adlington, near Chorley:—

Stanton Ironworks Company (accepted) ... £561

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THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 24, 1878.

POLYCHROME ORNAMENTS.

THE great illustration displayed at the Paris Exhibition of decoration in every form, and under every aspect, have brought anew into the field the genius of M. Racinet, who may be regarded as being for France the leading master in this art. He has assembled around him, indeed, a school, at the latest works of which a glance at the present time may be useful, chiefly as they apply, however, to discoveries in archaeology, and adaptations to architecture. It is a French style, be it remembered, and one belonging to the third quarter of the nineteenth century, which we are describing rather than criticising; and it may be looked upon as the artistic outcome—considered from one particular point of view—of the Christian year 1878, with all its rivalries. The chromo-lithography, in fact, of the Universal Exhibition was largely illustrative of architectural ideas—Grecian, Roman, and Mediæval—but all preponderating towards what is supposed in certain quarters to be the modern taste. Yet it is altogether unnecessary, for the sake of interpreting these latest developments, announced in the preliminary reports of the Paris Exhibition Commissioners, to do more than traverse the ground selected by the Commissioners. They say: “we have two thousand suggestions to consider—we have a hundred coloured plates to compare, and we have, moreover, the claims of architects, sculptors, painters, decorators, furniture-makers, stuff and paper colourers, carpet-weavers, cabinet-manufacturers, jewellers, and toy-makers to consider.” In the midst of all these, and above them all, arises from the French Exhibition of 1878, with its judgments completed, the question of Polychrome Ornament. The folio, quarto, and octavo volumes already published assist us in arriving at a result. They do not, however, confine themselves to examples of the present; they embrace—and in them the highest and brightest lessons are included—the polychrome architecture and ornament, both especially and variously of Greece, India, China, Japan, Persia, Pompeii, Egypt, and Assyria, though the illustrations are fewer or more numerous, exactly as the nationalities and their historical monuments vary. Thus of the Pompeian relics, it is said, they have been, in their meaning, expanded too far—they have been carried beyond and worked too far from their legitimate significance; but this is not the question just now. We are reviewing at once the earliest and the latest efforts and experiments of the ancients in polychromatic decoration, whether applied to architecture or otherwise, and the revival of M. Racinet with his academy appears to afford an occasion. The original work, of course, is well known. Its successors in several, and especially in the latest editions, are not. They complete, however, the epitome of French historical and contemporary taste in these respects, and are, therefore, worth studying. From the first illustration, styled “Primitive,” to the last or hundredth styled Eighteenth Century, twenty titles of ages are employed, leaving out those senseless distinctions of time and manners, which are supposed to be marked by the reigns of particular kings. Then—now that M. Racinet and his coadjutors—now that their labours are unfettered, and now, indeed, that they have been stimulated by the emulations of the past year—what do they undertake to say? To begin with, they have, upon the whole, repudiated their former editions, not less than their former tradi-

tions, and would begin the race anew. They commence by disavowing in great part obedience to mythical laws “and superior ideas” with which they refuse to conform. They even complain that painting and sculpture are “more or less fettered by sense and logic.” They admit, as a confession, that architecture must comply with various conditions—“solidity, the purpose of the building, and the co-relation of exterior aspect with interior use;” but they add, which is their object, “ornament, and especially that kind which now occupies us—the decoration of coloured surfaces—has a sphere of action doubtless more modest, but yet enjoying much greater liberty.” And so these authors go on, colour pencil in hand, building and painting up, from complicated interlacings, capricious arabesques, chemical compositions, in which the line, the flower, the animal, and the human figure are blended. It is with the tinting rather than with the outlines of the art thus illustrated that the preliminary exhibition reports are concerned. Gathering the experience of the entire world, as illustrated at Paris, the results are interesting, although in a degree monotonous.

Under the head “Primitive Decoration” we have, apart from carved forms and outlined patterns, a very limited use of colour, confined often to a deep black, contrasted with a bright red ground. The Mexican types suggest a larger abundance and barbarism of colour, but these have little to do, even in this connection, with historical art. So may be passed by the Egyptian and Assyrian, the Greek, Etruscan, and Greco-Roman periods, except that colour was employed in them all with a luxury of lavishness which, so far from being art, was wasted upon the horns of a bull with scarcely less contempt than was exhibited towards the altars of a temple. In the decorative painting of dwelling-houses the Romans, no doubt, took everything from the Greeks and the Latins generally, whether it were in Pompeii or in Herculæum, though in the former the purest instances are found. In it we find, moreover, the noblest applications of polychromatic colouring to mosaic, though this latter branch of art underwent, in the hands of the Romans, from the times of the Empire, many important modifications. They brought it, indeed—and here was the ruin of the art—into rivalry with the highest forms of painting. The Greeks had made the compartments of their paved floors represent ornaments, branches, scrolls, festoons, interlacings, and, passing onwards from these fanciful forms, to somewhat in the nature of arabesques, significant symbols and attributes, griffins, chimæra, tragic or comic masks, the signs of the zodiac, vine branches, birds pecking at fruits, and all the other well-known motives of classic and pagan ornamentation. But whence the colour? Pebbles, stones, natural or tinted marbles, paste and terra cotta, shells and fragments of pots, no longer enabled to contend with the true richness of painting, came in at a time when painters, impelled, says M. Jeançon, by a mad love of brilliancy and richness, borrowed from red lead, purple, azure, gold, and silver, their striking glitter and deceptive contrasts, mosaic demanding fresh resources from a multitude of precious stones, such as were employed in adorning St. Mark at Venice, and St. Sophia at Constantinople—agate, jasper, cornelian, sardonyx, emerald, turquoise, lapis-lazuli, “to imitate every fancy of the painter with his seven or eight principal colours.” This fashion, however, was rather a deceptive than a real one. The worker in mosaic had, it is true, more shades at his service, and the painter fewer tints; but his productions after all were more costly, although more glittering to the eye and smoother to

the touch. As a polychromatic art it, in the common course of things, had to give way, and become little more than a mere manufacture; the painters regained their position, and with their restoration arose a fresh period in the semi-barbaric architecture which condescended, in part, to colouring for its splendour. Such is a part of the parable read by M. Racinet and his brethren to their contemporaries; and since two-thirds of artistic France accept—though not without criticism—these conclusions from artistic history, they may be worth while considering.

The magnificent illustrations of the work explain their meaning. They abide by a theory that the ancients possessed a perfect knowledge of colour, and of its mutual relations. This is our key and clue through the whole labyrinth of the hundred splendid plates before us, re-arranged and re-adjusted, so to speak, as graduations in the history of the art—the blue ground in imitation of the sky, everywhere of the same intensity, with, however, the upper part predominating, and the lower appearing more distant and light, producing that aerial look which, on the part of the Greeks, was the result of practised, though imperfect, reasoning, while, in modern physics, it constitutes a theory of advancing and retreating colours. Without following the authors through all their details, we may quote them where they say, “When looking from a certain distance at coloured windows formed by red and blue squares, surrounded by a black grating, it seems as if the red were more prominent than the blue, and were actually standing out;” and “what completes the value of this mural painting is that theory further demonstrates that an artificial light of wax and oil, far from weakening the effect, only renders it more powerful.” The examples of the East, including China and Japan, are cited by M. Racinet and his colleagues, mainly to the effect that in art all isolated civilisations are unprogressive; but they add, “the symbolism of colours, enunciated by the Chinese ‘rites,’ is in reality nothing less than a statement of the early primitive colours recognised by painters”—yellow, red, and undecomposable blue. The Indian, Arabian, Moorish, and Persian annals exhibit in these respects similar results. The colours of their art are rich and yet monotonous; they begin with plenitude, and make no progress, but the Moorish decoration, as M. Racinet elaborately shows, is distinguished by a generally-adopted system, based on the principal employment of the three primary undecomposable colours—blue, red, and yellow—represented by gold. But in the Persian carpets of the most famous and luxurious eras we find shadings and tints in every direction—as scales rising from the ground, black slightly tinted white, blue, red, yellow, and what artists have agreed to call flesh colour, with a proper employment of gold, modified by a “judicious play of light on the paler parts.” The following passage is of exceeding interest:—“In the parti-coloured grounds, passing from black to white, from red to green, changing colour with the design, the Indians succeed in neutralising the most glaring intensities into a general harmony, by means of which gold, thrown over the rawness of the colours, seems to unite and warm, and, as it were, blend them into one, like a transparent veil interwoven with the gold itself.” These are studies, in the art of coloured decorations, which may be carried farther than even the speculations of M. Racinet, who goes on with the adornments of old German cathedrals, Byzantine altars, and even Scandinavian church-work, always in search of colours and their use. He finds it difficult to separate the history of design in outline, from that of colour-

ing in patterns, and thus occasionally confuses the two; but the difficulty was not an unnatural one, since the second form of idealism so irresistibly sprang from the first. In fact, no known writer has ever succeeded in separating the two completely. There are three processes in the production of ornament. It is laid down: the drawing or design, the colouring, and the relief. By the help of these means the artist may obtain the most varied results, all coming, however, within the following categories: The invention of subjects, purely imaginary, and foreign to the productions of Nature; the conventional representation of natural objects, expressed merely in their essential characteristics, and under a generalised type; and the imitative representation of objects, in which Nature is followed, both as regards design and colouring. This last topic is the most important to us at present. The frequent use of purely imitative painting, as M. Racinet admits, suggested charming decorations to the magic artists who adorned modern taste, and especially that of France, in the seventeenth and eighteenth centuries; not altogether, however, without abuse, not less than injury, to certain industrial arts—ceramics, painting on glass, and the manufacture of carpets. For example, “which would have gained by keeping to, and might even now gain by returning to, more truly decorative processes?” But, as a theorist has his right to the last word, we may allow M. Racinet his liberty of saying—“Where the representation of objects is ideal or conventional, the colour is likewise conventional, and the ornamentalist remains master of his palette. The severity of the design is thus redeemed by liberty in chromatics and the advantage of being able to choose and arrange the colours at will, without any necessity for resemblance, or even probability.” This was the original lesson, taught in Asia, and it has never, for art purposes, been effectually untaught in Europe.

ARCHITECTURAL GEOLOGY.—I.

IN olden times, when there was comparatively but little intercourse or traffic between different parts of the country, owing to the absence of good roads and the difficulty and expense of conveying materials over any considerable distance, the geology of each district exercised a far greater influence upon the character of its architecture than it does at the present day, when good roads, canals, and railways have made the carriage of building materials so easy and inexpensive. Thus we find that in those districts where stone of any kind could be obtained by digging down a few feet below the surface or from neighbouring quarries, hardly any other than the local stone was employed in old buildings, except perhaps where it was not of sufficiently good quality for carving or dressings, in which case a better stone would be brought from a distance, when the cost of the building was not an object for consideration. In some districts the only stones found near at hand were the rough flints, which are plentiful in the chalk and in gravel beds; and yet with this unpromising material some of the most beautiful architectural effects have been produced. In other parts, where no stone of any kind was to be procured, but good beds of clay or brick-earth abounded, much picturesqueness was obtained by the artistical use of brick, which was cut and moulded into different forms, so that the buildings in those localities often rivalled in beauty those erected in others which were favoured with a supply of good building stone. And even where none of these materials were at hand, but only sand or gravel could be obtained, our ancestors were never at a loss for materials, for by a judicious use of the timber which

was then everywhere plentiful, and by mixing lime with their sand, they produced those tasteful and substantial dwellings known as half-timbered houses, which equal in comfort and durability many of those built with stone or brick.

In the present day, however, all this has been greatly changed by the constant and rapid intercourse and traffic between all parts of the country, by which we are enabled, in many cases, to bring building materials from a distance at as low a price as we can obtain an inferior article which abounds in our neighbourhood, so that we have, in fact, the choice of a large number of building materials, and can select those which best suit our design. Still, however, it will always be found that local material stands its ground for the majority of buildings, especially in those erected as dwellings for the middle and lower classes, which afford but little scope for architectural display. Thus, in a clay country, these buildings will always have brick for their walls, while in a stone district the cottages as well as the mansions will be built of stone, to the almost entire exclusion of brick. In places where sand and gravel are plentiful they may be economically employed for walling by an admixture with a small proportion of lime or cement, thereby producing a concrete which will rival stone or brick in strength and durability.

We therefore, propose, in this and subsequent articles, to examine the peculiarities of the successive geological strata, and to consider what resources for building purposes each of them contains, so that the architect who is about to erect a building in any particular district may be able to ascertain beforehand what kind of walling material he is likely to find to his hand, and to arrange his design in accordance with his material. Thus in one locality he will find an excellent building stone, and in another a very inferior one, while in other places he can obtain excellent bricks and no stone, except what is brought from distant quarries; or the locality may be devoid both of brick and stone, and his only available material either sand or gravel.

Tertiary Strata.—The most recent geological deposits generally consist of sands and gravel which have been worn away from the older rocks by water, and transported to their present position, some of the pebbles having been brought from a great distance and rolled quite round by friction against each other in the course of their journey. In some places these deposits are of marine origin, being raised sea-beaches, consisting of sand and shingle which have attained their present level by upheaval of the land or the retirement of the sea. Such deposits are always valuable to the builder for making concrete and mortar; they are found in many parts of the Devon and Cornwall coasts, from Torquay to Mount's Bay and round to Bideford Bay; at Weston-super-Mare and the Mumbles, near Swansea; while on the Dorset coast we have the Chesil Beach, 15 miles in length and 200 yards in width. Further inland are the Burtle beds of the Somerset moorlands, which are sea-beaches consisting of red marl with sand and shells.

The alluvial deposits of gravel and sand are those which are most frequently met with in all parts of the country, having been produced by rivers, lakes, and estuaries; they often contain valuable beds of clay and brick-earth, alternating with the gravel and sand. One of the most extensive tracts of alluvium is that of Holderness, in East Yorkshire, extending also down the eastern part of Lincolnshire as far as the Fens of Cambridge; another tract is found stretching along the Lancashire coast from Fleetwood to Seaforth, near Liverpool. An alluvial deposit extends along the Bristol Channel from Chepstow to Cardiff on one

side, and on the other from Berkeley to Portishead, spreading out near Clevedon, Weston, Glastonbury, Bridgewater, and Ilchester. From the sand found at Bridge-water are made the “Bath bricks.” The alluvial deposit forming Romney Marsh, in Kent, is below the level of high spring tides. That deposited near Maidstone, in the faults of the Kentish rag, affords an excellent clay for brick-making. Near the mouth of the Thames is a large tract of alluvium, as at Sheppey, Shoeburyness, Foulness, and at Clacton-on-Sea, where there is a thick gravel bed with laminated clay. In many parts of the Thames Valley we find beds of brick-earth from 5ft. to 30ft. in thickness, as at Wanstead, Tottenham, West Drayton, Ilford, and Erith; while in the valley of the Medway extensive deposits of gravel are found. The eastern part of Norfolk is covered with thick alluvial deposits of sand and gravel.

The term “drift” has been applied to beds of gravel, sand, and brick-earth, which have been deposited during the “glacial” period by the transporting power of ice during a long prevalence of Arctic cold. The beds of gravel on which a large portion of London is built have been deposited in this manner, as well as many others found in the Thames Valley about Ilford and Grays Thurrock, in Essex; Richmond Park and Wimbledon Common, in Surrey; and at Wellhill, in Kent, where it lies upon the chalk. Drift beds of gravel cap the London clay at Stanmore, Barnet, Totteridge, Muswell Hill, Highbury, Epping, and Shooter's Hill. At Chelmsford the glacial deposit takes the form of brick-earth, while in some parts of Norfolk, Suffolk, and Essex, we find beds of clay full of chalk, pebbles, and flints, as at Tivetshall, Eye, Framlingham, Halstead, Dunmow, and Braintree, as well as at Watford, Biggleswade, Huntingdon, and Horncastle. Near Hertford is a drift deposit of gravel, consisting of chalk, flints, and quartz pebbles, with sand and seams of chalky boulder clay. In some cases, as at Norwich, the glacial sand has been converted into a building stone through the dissolution of chalk by carbonated water, which has percolated the mass and acted as a cement to hold the particles of sand together.

The “London clay” series of beds are next in order of age to the drift, and consist of marine deposits of stiff clay, with occasional beds of sand. It is found most extensively under and around London, along the Valley of the Thames, and immediately overlying the chalk. There is also another large deposit of the same series called the Hampshire basin, extending along the western part of Sussex, South Hampshire, into Dorset as far as Dorchester and running inland to within a short distance of Salisbury. In some places a deposit of sand called the Bagshot beds is found overlying the clay, as at Bagshot Heath, Windsor, Chertsey, Sandhurst, Weybridge, and Esher; also on the higher grounds around London, at Harrow, Hampstead, and Highgate. These beds are chiefly sand, of great value for building purposes, but also contain occasional layers of brick-earth. In the Isle of Wight the Bagshot beds attain a thickness of 200ft., and consist of fine, pure white sand, highly prized for glass-making; while at Poole, in Dorset, they contain a bed of clay, which is used for making ornamental tiles.

The average thickness of the London clay beds is about 400ft., but in some places in and around London it has been bored through and the chalk reached 150ft. below the surface. In the London basin this deposit is found on the south at Epsom, Croydon, and Beckenham; also at Ditton, Sutton, and Merton, in Surrey, there are uncovered tracts of clay. It extends westward, as far as Windsor, and by the banks

of the river Colne to Uxbridge and Hendon. All the elevated parts about Norwood and Sydenham, Forest Hill, Shooter's Hill, Stanmore Heath, and Richmond Park, are formed of London clay, and it extends along the left valley of the Lea from Waltham Abbey to Chingford in a range of clay hills. Wherever it occurs near the surface it is extensively used for making bricks and tiles. Some blocks of an argillaceous limestone called "Septaria" are frequently found embedded in the clay, and are used for the manufacture of Roman cement, being obtained from the cliff of London clay at Sheppey, and also by dredging, near the mouth of the Thames.

Below the beds of the London clay is sometimes found a stratum of *Plastic clay* with sand, which is developed near Woolwich, Reading, and at Allum Bay and Whitecliff, in the Isle of Wight, as well as on the Dorset coast, at Studland Bay. It is used for making bricks and the coarser kinds of pottery.

No spring water can be obtained by sinking wells into the London clay, on account of its impervious nature, and it is necessary to bore through to the chalk or greensand below, from which an abundant supply is generally obtained; this water, however, has a considerable degree of "hardness," from holding in solution the bicarbonate of lime; but if lime-water is added to it an insoluble carbonate of lime is formed, which falls to the bottom, and nearly all the lime in the water is thus got rid of.

TOWN AND COUNTRY MANSIONS AND SUBURBAN HOUSES.*

OF late years there has been a more than plentiful supply of illustrated designs, yet some architects are so prolific that a volume of designs every now and then appears, for which the only apology for publication seems to be that they are illustrations of executed works. Examples of buildings which are really erected have their value, but it is in proportion to the merits of the works or the typical character or speciality of the buildings themselves. New designs for houses, to be of any use, should be suggestive of planning, or they are of little value either to the architect or the public, and the most they can profess to show is some typical and special arrangements that may be carried out. Mr. William Young has added another contribution to the literature of stock designs, and he says in his preface the success which has attended a previous work illustrative of suggestive designs "has induced him to publish a supplementary volume of a more practical character, with illustrations of executed buildings." The work before us professes to illustrate recent improvements in the planning and construction of domestic buildings, and to give some information on sanitary and artistic details. How far these objects have been attained in Mr. Young's present work we leave the reader himself to judge, but we may ask one question that pertains equally to other works of this kind, and that is: For whom is the work specially intended—the professional man or the public? Upon this question much of the value of the work rests. If the author intends his work for the unprofessional reader, there is much in it that will be of interest, and some useful information may be acquired respecting the wants of houses; and we believe, from a general perusal, that this has been the author's intention, though we rather think some irrelevant topics have been introduced into the introductory pages. The chapters on architectural design from

Gothic to Queen Anne, Gothic *versus* Classic, seem to us rather out of place in a book of designs, however much in place it might have been in a work treating of style or architectural æsthetics.

Mr. Young gives some good—if not new—advice to the builder of houses. The advantages of well-planned, well-designed houses are dwelt upon, though we cannot admit that modern architects are so keenly alive to the importance of scientific scheme and construction in house-building as Mr. Young seems to believe; nor can we endorse the opinion that there is more real life in architecture, and more fertility and vigour of the inventive faculties of design at the present day than at any former time. The author in the next paragraph qualifies this considerably, for he truly says, "If anything we are too prolific in design," we run riot in the display of this faculty, and bring too much grist to the mill, and he concludes by saying we have so much food, both artistic and scientific for the brain, that it would be a blessing if invention would stop for a time to allow of digestion—a remark which entirely accords with our opening observations.

We skip over the chapters on style which give some sensible advice about selecting a style, and the motives that should dictate the adoption of Queen Anne or any other fashion, simply noting a strong *pencilant* for eclecticism on the part of the author, also some remarks on plans and arrangements of houses, in which we find ourselves at one with the author in preferring kitchen offices placed on the ground floor. In the chapters on the various apartments and sanitary details some useful observations will be found, but we pass on to notice the manner in which the author's principles are put into shape. Many of the designs are old faces to us, and we recognise some that have been illustrated in our own pages. Plans, elevations, and perspectives are given, and the author acknowledges the assistance he has received from Messrs. M. B. Adams and E. W. Poley in preparing some of the plates for photo-lithography. Mansions in Cadogan-square form the subject of the first plate, and these we glanced at last week in our notice of new works at Chelsea. Mr. Young has here adopted rather the features of the Renaissance, more regular than those of the Queen Anne, followed by other architects in the neighbourhood. There is little to find fault with, though we may take exception to the chimneys, and some of the lesser features, and on the whole a little less redundant treatment in the decoration and more repose would have been better. If the centre bays had been omitted a quieter and more agreeable effect would have been obtained. By the bye, we notice the plans of the centre houses do not quite agree with the elevation, as the bays have only two windows in plan, while they extend the whole width of front in the façade. The plans are the best part of the design, and we see the author has lighted his staircase, which forms a central square hall between the back and front rooms, by a skylight. A gallery communication is also shown between the front and back rooms of the ground and first floors; and this gallery forms one side of the staircase area, and is lighted from it. The library and dining-room on the ground floor, and the two drawing-rooms above, are thus connected privately—a feature we have before recommended. A boudoir is placed at the end of the back drawing-room, though it does not fully occupy the width of the plot, but is lighted from a narrow side area, not perhaps in the most desirable way. A conservatory, however, outside the back drawing-room window, and having access from the boudoir, is a redeeming feature. On the upper three floors seven

large bedrooms, besides three smaller ones and dressing-rooms, are obtained. A lift traverses the house near the kitchen, and a stable and coachman's house occupies the rear of the plot. The next design illustrates a pretentious manor-house, erected at Haseley, in Warwickshire. Here, again, the plan has most to recommend it; for the *porte-cochère* and the tower behind it combine somewhat incongruously with the composition—while the number of breaks and projections, and the multiform shapes of bays and angle oriels, confuse and produce a frittered effect. The garden front makes by far the most successful composition. Looking at the plan, we fail to note a compass-point, which—as in this and other plans—would have much added to the value of the examples. The outer hall, inner hall, staircase, and billiard-room arrangement is good, and the inner communications are better than in many houses of this class. Chelsea House, erected from designs of the author for Earl Cadogan, is a costly example of Italian, executed with ashlar facings of Portland stone. There are some points, such as the fragments of pilasters at the angles of the bayed projections, amenable to criticism; but the plans are skilfully contrived for the site, and afford a good example of town planning. The chief apartments are said to be decorated in different styles. The dining-room is after Adams, the library Queen Anne, and the drawing-rooms Louis XIV. and XV. We cannot admire some of the latter work—it is tawdry and overloaded, especially in the frieze panels. The dining-room decorations (Plate IX.) and the ceiling (Plate XII.) are in a more refined taste. The effect of the decoration of Chevening Hall (Plate XXX.) is perfectly spoilt by the over-liness of the drawing. Plate XIII. shows the view of principal staircase, in which there is much that is good, though the lower Ionic columns look out of proportion in drawing. Holmewood House, Hunts (not Hants, as spelt), in red brick and stone, is pleasing in elevation, though somewhat heavy in detail. We do not like the prospect tower—a treatment the author seems partial to—and the details of entrance look somewhat coarse. Plate XV., showing staircase, exhibits one or two faulty features: we allude to the running in of the lower arcade cornice upon the return landing, and the prodigious cove of ceiling, the end of which does not terminate at all happily against the window. In this and other illustrations there is a coarseness in the shading which detracts from the effect. Plate XVII. shows a design for a mansion at Kensington. The front façade is light and freely treated in a sort of Renaissance suitable for red brick, but the porches are not so happy. The arrangement of hall and staircase is clever. In the design for house at Broadwater in half-timbered style there is a lack of connection, and the centre gable treatment has a rather hodge-podge effect, intensified by the porch not being centrally placed. The plans are much better. Oxhey Grange, Herts, is a remodelled shooting-box, and is an example probably of little value. The porch placed askew, the diversities of gable treatment, and the heavy splay to the windows of the near gable are not models to follow, however well they may have served their purpose. The house at Castle Hill is a better example of a small country or suburban house, with sunk kitchen offices. Some gate lodges and a few other designs, including studies for chimney pieces, are illustrated. Though there is nothing very objectionable in any of the designs, there is, to our minds, a rather over-laboured effect in some of them, which has been perhaps intensified by the style of drawing and lithography. There is a flatness and deadness of shading in many of

* Town and Country Mansions and Suburban Houses: with Notes on Sanitary and Artistic Construction. Illustrated by 30 plates. By WILLIAM YOUNG, Architect, London. E. and F. N. Spon, Charing-cross.

the illustrations, and we are of opinion that a more sketchy style would have been better adopted; otherwise the work is well printed and got up, and will take its place creditably among works of a like nature.

DANGEROUS SEWERS AND HOUSE DRAINS.*

DR. W. COPLEY WOODHEAD, of Leeds, has published a pamphlet under the above title, the object of which is to set forth a new mode of preventing the entrance of sewer gases into houses. Our readers have had so many inventions brought under their notice of late that any new scheme may appear superfluous. Dr. Woodhead discusses some of these, and he attempts to show that they are not only useless, but often a source of danger. Referring to a special contrivance much advocated of late, in which there is an air-chamber with grated opening, into which the house pipes enter, divided by a partition in the centre, and a siphon trap on the sewer side, it is argued that the gases will be drawn into the house—the heavier gases especially—because they will not rise so readily out of the chamber as the lighter ones. It is also contended the greater weight of the external air in the air-chamber will force up the sewer gas, and any specific germs, into the house, via the house pipes. The ordinary plan of carrying up to the eaves the soil-pipe as a ventilator is for a similar reason pronounced inoperative as far as the entrance into the house of specific germ poisons generated in the drains. Dr. Vacher is quoted to show that by keeping out sewer gas we do not prevent the entrance of the small albuminoid particle, insoluble in water, which is the specific germ of typhoid, and is propagated in sewers and pipes. Sulphuretted hydrogen might be shut out, but still the poisonous particle may elude the checks. It is doubtless a great error to imagine, as many do, that anything we can smell is dangerous. What is dangerous is not a gas at all, and could not, like gas, be volatilised. Speaking of Mr. Norman Shaw's plan, Dr. Woodhead does not consider it excludes sewer gas, as an experiment he describes proved that water placed in the soil pipe became impregnated with fungi of the same character as that in the siphon trap. Proceeding to explain his own plan, the author says, "The principle for which I contend in preventing sewer gas and specific germ poisons contaminating the atmosphere in the dwelling under our existing mode of constructing sewers consists—first, in having a free and constant circulation of fresh air through the house drain from its commencement to its termination in the main sewer, the current always setting in the direction from the house to the sewer; secondly, in placing an effectual barrier to the entrance of sewer gas or specific germs out of the sewer into the house drain." Dr. Woodhead, to attain his object, makes the aggregate area of the openings that admit the fresh air larger than the aggregate area of openings for the efflux of that which has become vitiated. By this means the outward and heavier air overbalances the lighter gases contained in the drains, and they escape upwards. To accomplish this the author inserts into the house drain a funnel-shaped mouthpiece for ingress of fresh air, into which the soil pipes discharge at surface, open to the air by a grating, and another and smaller outlet-pipe or egress-tube at a short distance from termination of drain, or at junction with the street or main sewer. Both openings terminate at ground level. The house drain and the two openings thus

form a connected and bent tube, through which a circulation of air takes place from the larger or house end to the smaller or sewer end of drain. A siphon is also placed to check the sewer gas from entering this drain between the main sewer and the egress tube. The theory is that a larger and heavier column of air at the mouth of house drain will overbalance and force out at the egress tube any lighter gases generated in the intermediate length of drain. In most of the systems the air is made to enter at the foot of soil-pipe, the current being through the house-trap and upwards. In the plan under notice the current through drain is reversed, and is made to clear the drain outward from the house. The heavier gases are also driven out of the egress tube by the passage of sewage through the drain, the vacuum being filled by a current of fresh air from the larger opening, and by this means it is thought any specific germs in the drain will be destroyed. Further to check the entrance of sewer gas or germs into the house drain, another siphon is placed at the junction of sewer and drain, and a manhole or air-shaft is built to the ground level, where a grating is placed, up which any gas or germ poison that escapes the first trap finds vent. The other diagrams in Dr. Woodhead's pamphlet show different forms of the same system; one shows a double ventilated siphon trap near the house, for cases where the larger scheme cannot be carried out. We cannot see the absolute utility of this double siphon if the open receiver is introduced into the head of the drain, as this opening and one air-tube on the house side of the trap would create the necessary current. This second pipe and siphon appear moreover to us to complicate the system, which is based on a correct principle. We can recommend Dr. Woodhead's pamphlet to all sanitary engineers. The explanations are, however, somewhat diffuse and discursive, and the principle might have been explained in less than half the space.

ARCHITECTURAL ASSOCIATION.

A MEETING of the Architectural Association was held on Friday evening; the President (Mr. H. L. Florence) in the chair. The following were elected by show of hands as members:—Valentine Vagolini, W. M. H. Burditt, B. L. Westbrook, J. S. Blake, H. Moore Newlyn, D. J. Budge, H. Ough, A. Ebb, H. G. S. Young, Lewis Edwards, J. G. Hall, A.R.I.B.A., M.I.S., A. W. Bowen, Reginald Beesley, W. H. Bendle, G. S. Weir Tappen, Brett A. Elphicke, J. B. Chubb, T. E. Jamieson. Mr. PAGE (Hon. Sec.), announced that the first visit of the session would take place on the 25th inst. (to-morrow), and would be made to the Grand Hotel, Northumberland-avenue.

MR. THOMAS BLASHILL read the following paper on

PARTY WALLS: THE LAW AND THE PRACTICE.

There exists in London a long-established custom of building between adjoining houses not two separate external walls, one standing upon the ground of each owner, but one wall, the centre of which is usually placed perpendicularly over the boundary line of the two properties, which wall is known as a "party wall." The obvious convenience of this arrangement, both as saving space and reducing the cost of building, has caused it to become general in places where land is valuable. It is therefore of importance that those who have to deal with such property should be acquainted with the laws relating to it, and with the difficulties most likely to be met with in the course of practice. Although the subject is not very simple, I hope to submit it in a shape that will lead to useful discussion. In London the law with respect to party structures is contained in the Metropolitan Building Act, 1855, the provisions of which have been embodied in the local acts of some other towns. To this Act I shall limit the subject, for where it is not in operation the

rights and duties of parties who are presumed to be tenants in common of a party wall are not so much matters of general interest and importance as is the case where such walls are the usual mode of separating buildings from each other. What is a party wall? The Act says, in the interpretation clause, "party wall" shall apply to every wall used or built in order to be used as a separation of any building from any other building with a view to the same being occupied by different persons." This is generally satisfactory, and a wall standing as the separation between the rooms of two houses may almost safely be considered a party wall. But there are cases in which, on examining the construction and the elevations of two houses, A and B, it is clear that A was first built, as a distinct and complete house, and that B has afterwards been added, the wall in question having been made use of, perhaps, surreptitiously, and the deeds relating to A may show that the ground on which the whole wall stands was conveyed to the owner of it. I think that when this is clearly seen the wall must be considered to be the external wall of the house, A. The wall was certainly never built in order to be used as a separation of the two buildings, and the true boundary line of A seems to be at the outer face of the wall, while the house, B, was wrongfully built without any external wall on that side. Although many persons differ from this view, I think that as the land on which the wall stands is wholly the property of the owner of A, the most that can be said is that the owner of B has acquired an easement over the wall to the extent to which it is used by him. The Act goes on to say—"Party structure" shall include party walls, and also partitions, arches, floors, and other structures separating buildings, stories, or rooms, which belong to different owners, or which are approached by distinct staircases or separate entrances from without." The provisions, so far as they relate to party walls, are of two classes—those which regulate the nature of the construction, and those which fix the rights and duties of the respective owners of a wall with respect to each other. Part 2 of the Act, which relates to "dangerous structures," has also an important bearing on party walls. The first class includes such things as have to be done under the supervision of the district surveyor. With respect to them much misapprehension exists, but where carefully studied they become tolerably clear. I only propose, therefore, to bring them together in a form convenient for discussion, and such as will form an introduction to the much more troublesome and difficult class of provisions which relate to building, and adjoining owners. By Section 27 of the Act every building must be separated from every adjoining building by two external walls, or one party wall, and under particular conditions of size and occupation the other party structures above defined must be used. By Section 9, any "alteration, addition, or other work," which affects the construction of a party wall is subject to the regulations of the Act. Section 10 provides that whenever more than one-half of an old building has been taken down, every part of the remainder of it that is not in conformity with the Act must be taken down; and Section 11 provides that whenever as much as one half of any timber or other partition not in conformity with the Act, and separating old buildings, is removed, the buildings must be divided from each other as directed by the Act. The first schedule of the Act gives the thickness of "external and party walls" with reference to their lengths and heights, the height (for this purpose) being measured from the base of the wall to the level of the top of the topmost story, which means the under side of the tie of the roof, or half the vertical height of the rafters where there is no roof tie. But the party wall must, by Section 17, be carried up above the roof, flat or gutter of the highest building adjoining thereto, so that it shall be 15in. above the flat or gutter, and 15in. from the roof, when measured at right angles to its slope. If any turret, dormer, lantern light, or other combustible erection be upon the roofs within 4ft. of the party wall, the wall must be carried up 12in. above such erection, and be 12in. wider on each side than it is. Also the wall must be carried up above any part of a roof that is opposite to, and within

* The Dangers of our Sewers and House Drains, with Means of Removing these Dangers. By W. COPLEY WOODHEAD, M.R.C.S., Leeds.

4ft. of such wall. By Section 13 recesses may be made in party walls, but the backs of these must be 13in. thick; they must be arched over, must not come within 1ft. of an external wall, and must not extend over more than one-half the area of the party wall. Section 18 forbids that a chase cut in a party wall should exceed 14in. in width, or 4½in. in depth, or should leave less than 8½in. of brickwork at its back, or should be within 7ft. of any other chase on the same side of the wall. By Section 28 any opening made in a party wall for the purpose of uniting two buildings which together would contain over 216,000 cubic feet must be not more than 7ft. wide and 8ft. high, and the floor jambs and head must be of brick, stone, and iron, and have two wrought-iron doors, each ½in. thick, separated by the full thickness of the wall, each fitted in rebated frames without woodwork of any kind. Buildings so united must be in the same occupation, and when they cease to be so occupied the openings must be built up. By Section 20 the back of every chimney opening in a party wall must be 8½in. thick from the level of the hearth to 12in. above the mantle, and no chimney breast or shaft built with or in a party wall must be cut away without the certificate of the district surveyor. Sections 24 and 25 fix the thickness of the party arches which have to be constructed to separate different properties. As to timber in party walls, by Section 15 the ends of bressumers and of beams or joists if bearing upon party walls must be 4½in. from the centre. Bressumers must have stone or iron corbels under them, and must have 4½in. piers or else story posts under them in addition to their bearing on the party walls. The foregoing regulations will help to a right understanding of that part of the Act which deals with the rights, duties, and powers of the respective owners of party structures. These are the subjects of constant dispute, often leading to grave annoyance and loss; it is therefore highly important that from the first step everything relating to a party wall should be conducted with careful reference to this part of the Act. But, in fact, this is very often neglected, the whole proceeding being carried on without regard to the law, or in reliance on the good nature of the respective parties, although as neighbours they are in a position of natural antagonism to each other. The following considerations will show that such a practice as this is unsafe, and ought never in any case to be followed. Laws are made to be observed, not to be ignored. A client has a right to expect that, when there is a well-known mode of procedure legally established, that mode shall be followed by his architect in every particular. Although he will give no special credit if everything goes well, he will have a right to complain if they go badly. There is always a great risk that some complication will arise even in the simplest matter, especially if it is known that it is being loosely managed, for then either party may see his way to gain something by taking advantage of the want of strict management; even where all parties wish to be fair it often happens that owners of property are so nervously anxious about it, that they think every one that touches it is doing them mischief. Then the parties may quarrel during the progress of the work, or they may die, when their successors would be neither legally nor morally bound to adopt any arrangement not legally made. It very frequently happens that parties are only limited owners, being lessees or tenants for life, or they may be trustees for parties who will hold them responsible for any damage to the property. If the owners are a public body their officers will not be justified in allowing anything less than the strict fulfilment of all legal requirements. If any loss is caused through irregular proceedings the architect or the builder may find himself saddled with the whole responsibility for damage caused in executing works which he had no more real authority to do than any man in the street. Lastly, it is generally quite a little trouble to do what the law requires as to manage the matter in any irregular way. The owners of a party wall are called "tenants in common" of the wall; they are not owners each of the half wall which stands on his ground. Where there was no Building Act either owner could pull down the whole if he thought he should like to have a better

one. The only foundation in the Act for this idea of separate ownership seems to be in the interpretation of the word "area," which, as regards a building, is to include "such portions of the party wall as belong to the building." Party structures, considered as belonging to different owners, are dealt with in Part III., beginning with Section 82, which enacts that such one of the owners of the premises separated by or adjoining to any party structure as is desirous of executing any work in respect of it shall be called the building owner, and the owner of the other premises shall be called the adjoining owner. Now, the "owner" (by the interpretation clause) applies to "every person in possession or receipt either of the whole or of any part of the rents or profits of any land or tenement, or in the occupation of such land or tenement other than as a tenant from year to year or for any less term, or as a tenant at will." At an early period, often before the old building is pulled down, the building owner should cause a party-wall notice to be served on every adjoining owner, and as the work to be done may not as yet be finally settled, it is wise to include all the matter which a building owner can do in the notice. There is often great difficulty in finding out the real owners; a weekly tenant will represent himself as a leaseholder, or a bona-fide leaseholder may have so short a term that he will be gone before the notice expires. As a rule, it is best to serve a notice on everybody who seems to have any interest in the property, for if they are not owners, the notices will not make them owners. The notices usually bring all parties to some arrangement. If there is a leaseholder he being responsible to his lessor most usually and properly, is the party solely dealt with, but the freeholder will sometimes insist on protecting himself also by an award. The notice is printed and sold by authority of the Metropolitan Board of Works, and is usually filled up and served by the architect of the building owner. I suppose it is intended that this ordinary matter may be properly managed without its being necessary to take legal advice and incur needless expenses. As it cannot be properly said to be the architect's business, he had better strictly limit himself to such cases as are quite plain and clear, and if there is the least doubt as to the proper parties on whom to serve notices (as there must often be in the case of trusteeships and of companies) he should let his client's solicitor take the responsibility. The same may be said when the clients are trustees or a company. The notice must be given to the adjoining owner three months before any works can be done, by delivering the same to him personally, or by sending it through the post in a registered letter at his last known place of abode. All other notices or requisitions must be served in the same way. The architect is usually named in the notice as the surveyor appointed by the building owner to superintend the work, and to settle on his behalf all matters of difference that may arise in relation thereto. This is convenient, but not necessary, for the building owner is not bound to appoint a surveyor until he has received ten days' notice from the adjoining owner to do so. It is very common to receive a party-wall notice signed by the architect on behalf of the building owner which is invalid, and if any difficulty arises, his client may disown him. It is also common to name as "the surveyor" a firm of architects, instead of that member of the firm who intends to act: in these cases the appointment is invalid. We have nothing to do here with the motives which may often render it desirable for the building owner to keep the exact nature of his intended operations secret as long as he can—such, for instance, as his possible interference with ancient lights. But as a rule it is only courteous to let the adjoining owner know, if he wishes it, as soon as possible, what is to be done, for it may happen that some of the works included in the notice will so seriously interfere with his property that long notice and arrangement with other parties is necessary. I have had cases where the nature of the occupation of adjoining premises was such that it was found better to build a new external wall than pull down and rebuild the party wall. If the adjoining owner does not within fourteen days express his consent to the

notice, "he shall be considered to have dissented therefrom, and thereupon a difference shall be deemed to have arisen" between the parties. It is as well that this difference (which is almost inevitable) should be allowed to arise thus by lapse of time rather than by writing a formal letter, which may convey the idea that serious obstruction is intended. After the lapse of this time the adjoining owner may appoint the surveyor who is to act on his behalf, but he is not bound to appoint him until ten days after he has had formal notice to do so, for the original party-wall notice does not ask him to appoint a surveyor, though many persons seem to think it does. If either party makes default in appointing his surveyor after this ten days' notice, the party giving the notice may make the appointment in the place of the party making default. The building and adjoining owners may concur in the appointment of the same surveyor, who in that case has the same powers as the two surveyors and the third surveyor whom they are required to appoint. This appointment is very often neglected; a surveyor who desires to obstruct will avoid it. It is, however, the first business to be done between the two surveyors, whether they are going to agree amicably or not. He will naturally be some person who both parties believe will act fairly and impartially if required. If either party refuses to join in the appointment of the third surveyor there is nothing in the Act to compel him to do so; it is a matter for legal advice, but it is a very unusual course to take. On this point I would remark that it does not seem the duty of surveyors, when placed in the position of arbitrators, to exercise their ingenuity in placing obstructions in the way of the other side, as if they were solicitors instructed to fight a matter to the uttermost. They are appointed to see that the difference is fairly adjusted, and that is all that either side can honestly desire. The appointment of the third surveyor should be in writing, signed by both parties, although he may never be called upon in the matter. Indeed, I believe that the Act is clear that he must at least be appointed, for the 7th clause of the 85th section says that the "one surveyor" (agreed on between the parties) "or three surveyors, or any two of them, shall settle any matter in dispute." So that they must be two of three, and not simply two. Observe also that the third surveyor is not an umpire, as is often imagined; he can only act with one or both of the others, and in cases of very great difficulty and responsibility he had better be joined with the other two for the security of all parties, and to show that every care had been taken to arrive at a proper decision. The duties of the surveyors are "to settle any matter in dispute between such building and adjoining owner, with power by his or their award to determine the right to do and the time and manner of doing any work, and generally any other matter arising out of, or incidental to, such difference." But as they have no power to award that the work shall be begun before the expiration of three months from the date of service of the party-wall notice, which requires the permission of the adjoining owner himself, there is an appeal within fourteen days to the county court, which brings the matter into the hands of the lawyers, where we may very well leave it. The award must not deal with anything beyond the Act, and if in carrying it out injury is done to ancient lights of the adjoining owner, it will not protect the building owner from the consequences thereof. We find the rights of the building owner defined in the 83rd section. The Master of the Rolls recently laid down in a case in which I was engaged, that this section contains all his rights, and that within the area affected by the Act he had no others. The 88th section regulates the apportionment of the cost of works that may be done, and it will be convenient to read the two sections together.

1. The building owner may repair any party structure that is defective or out of repair, and the cost in such case must be borne by the two owners in due proportions, regard being had to the use which each makes of the structure.
2. He may pull down and rebuild, if it is so far defective or out of repair as to make this necessary or desirable, on the same terms as to the cost.
3. He may pull down any timber or other partition dividing the building that is not con-

formable to the Act, or to either of the two older Building Acts which next preceded this Act, and build a proper party wall instead, each owner bearing his due proportion of the cost, according to the use he makes of the wall, and also to the thickness of wall which his building requires. 4. He may deal with intermixed property; and, 5, with buildings communicating over public ways, which will involve very complicated questions not relating to party walls, and which may therefore be passed over here. 6. He may raise any party structure permitted by the Act to be raised, or any external wall built against such party structure; but as this would be solely for his own convenience he must bear the cost, and must, besides, make good all damage occasioned to the adjoining premises, or to the internal finishings and decorations, and carry up all flues and chimney stacks of the adjoining owners so far as the new works may render it necessary. 7. He may pull down any party structure that is of insufficient strength for his intended building, and may rebuild it of sufficient strength, on the like conditions as to cost and as to making good damage to adjoining premises, their internal finishings or decorations. 8. He may cut into any party structure at his own cost, and on condition of making good damage to adjoining premises. 9. He may cut away any footings, chimney breast, jambs, or flues projecting from the party-wall, in order to build an external wall against it, or for any other purpose, on the same conditions as to payment of cost and damage; and although they, being upon his side of the wall, may be considered his own property, he cannot deal with them without a proper award under this Act; nor can he cut away the chimney breasts or shafts without the certificate of the district surveyor, as already pointed out. And after the external wall has been built the party wall remains a party wall, which may cause future trouble to either owner, or to both. Finally there is a very comprehensive clause giving the building owner a right to perform any other necessary works incident to the connection of party structures with the premises adjoining thereto. It will be seen that there is very great scope for the exercise of the judgment of the surveyors on most of these points. There is the just apportionment of costs when work has to be done at the expense of both owners. Where the respective buildings differ greatly in size, and the party wall, which would be thick enough for one, has to be built thicker in respect of the larger building, the exact position of the centre of the wall with respect to the line dividing the two properties may have to be fixed separately for each floor. As there are certain parts of the metropolis where the space in a building, occupied by a thickness of only 4 in., more or less, in a party wall, would be worth several hundreds of pounds, the importance of this arrangement is evident. Besides this, questions as to what damage has been done to the premises of the adjoining owner, his finishings and decorations, and the value thereof, are often very complicated. No power is given to make the building owner hoard up or pay for hoarding up the rooms of the adjoining owner that may be left open by pulling down the party wall. No award, therefore, can deal with that particular item, whatever remedy might be found by action at law—a not very promising proceeding. If the building owner fails to make good any damage done he is liable to a penalty not exceeding £20 per day, at the discretion of the magistrate. Although power is given above to raise a party wall no power is expressly given to underpin or to continue the wall downwards—an operation frequently requiring to be done, and included in a party-wall notice. I think we may draw a distinction between an ordinary act of underpinning, where such work is necessary by reason of the base of a wall being decayed or placed on a defective foundation—which act is of the nature of a repair—and the act of extending a wall downwards for the purpose of forming a basement of one or more stories in depth below the old foundation. The Master of the Rolls, in the case to which I have referred (*Standard Bank v. Stokes*), had all this before him, and gave the opinion that the power given to raise a wall is wide enough to include this downward extension of it. He

said—“Is it necessary to limit the word ‘raise’ to putting something on the wall on the top? And may not you raise or make it longer, or build it up by something on the bottom? I do not think it necessary so to hold.” He considered also that, having power by another subsection of the Act, to pull down a wall and put it up again, it would be an extraordinary reading of the Act to say that you may not do something less—that is to say, support it, and put a new wall underneath it? But the judge founded his decision on the power which is given “to perform any other necessary works incidental to the connection of party structures with the premises adjoining thereto.” He said—“If you make the sub-basement, and you do not support the wall, it will fall down, and it is incident to its connection, because if it fell down its connection would be terminated in a very summary manner.” If one may presume to choose between these three reasons I should say the last seems to be the best.

(To be concluded next week.)

FARM ARCHITECTURE.*

FARM architecture occupies a position between domestic and plain utilitarian or engineering construction which has but few attractions for the architect whose sympathies attach themselves solely to the more artistic or decorative side of his profession. Hence it is not perhaps strange that the design and planning of agricultural buildings have been of late years relegated to a special class of professional men. At present the design of farm buildings is regarded as a kind of *tertium quid* best left to the agriculturist or farmer himself, and about which there is little to require architectural aid. This kind of unconcern has, however, a danger in it, for as we have pointed out in these pages before, the architect is losing ground by allowing a branch of specialists to take away a source of profit which for centuries has been a legitimate branch of his calling. Specialism will of course increase as the requirements of society become more numerous and complex, but as we have those who devote themselves to churches and schools, houses and mercantile wants, so there is ample room for many of the younger members of the profession to study the requirements of the farm, and make themselves competent to throw a charm round our farmsteadings and rural buildings. If furniture, carpets, and wall-hangings are worthy of the architect's attention, we do not see why his pencil and artistic power should be withheld from a class of buildings which represents so important a field of British industry as that of farming and agriculture. An additional reason why we think the subject is one not unworthy of his skill is, that of late years many improvements and systems of husbandry have been introduced, and that the old farm-steading, picturesque as it often was, is being fast superseded by a more scientific and less pleasing arrangement which it is within the true architect's power to recast into more artistic forms. What, for instance, could be a more appropriate subject for those architects who are reviving the old English homestead, than the farm with its group of sheds and buildings? We are prompted to make these remarks by a small octavo volume lying before us entitled, “Practical Architecture as applied to Farm Buildings of every Description,” written by Mr. Robert Scott Burn, farm architect and engineer, and the author of several works on similar subjects. The book is a reprint from a series of articles that have appeared in our contemporary, the *Country*, and will be found a most useful guide to the planning and construction of farm buildings. The author has given a careful digest of the practical details of farm construction rather than a comprehensive treatise on general principles. After generally referring to the three systems of farm planning known as the “compact,” the “grouped,” and the “isolated or detached,” the arrangement and details of stock buildings are discussed. Two or three forms of cow-houses or “byres” are illustrated, and of course in all of them the feeding passage is recommended both for the purpose of

keeping the cattle quiet and also for the cleanliness thereby insured. For small houses, where from four to eight cows are kept, the sheds are about 18ft. to 22ft. wide, out of which there is a 3ft. 6in. feeding passage, a 5ft. 9in. length of stall, a space of 5ft. 6in. in front, the cleaning or dunging space next the wall, and a 9in. gutter between. In the double-stall arrangement the cattle are placed head to head in two rows, with feeding passage down the centre. Another double arrangement shows a duplication of the first single row plan, the stalls being placed in rows along the front and back walls with passages for feeding close to the walls, and the dunging passage down the centre of shed bounded by gutters on each side, and laid slightly convex. The latter plan is recommended as the best for large cow-houses, especially where the proprietor desires the dunging to be done quickly and economically, as the manure is then carried off through a centre door in the end wall. Both systems, however, have obvious advantages over the single plan, which are discussed. Various details are entered into, and we may refer to the suggestion that single stalls are preferred to those for holding two cows, and the author justly says stalls are generally made too narrow, and he advises about 4ft. 6in. as the best width. As regards floors, Portland cement, concrete, or asphalt, are spoken of with more favour than stone or brick, which last materials are hard and uncomfortable for the cattle if laid at the top part of stall. Channels or grooves cut obliquely to a centre groove leading to the main gutter or simply inclined floors, are certainly less troublesome than sparred or open timber frames with space underneath into which the dung falls—a mode preferred by some feeders. We are certainly inclined to agree with Mr. Burn when he questions iron fittings for the “travis” board or division between the stalls. They are certainly not so comfortable nor warm as wooden fittings for the cattle to come in contact with, and if the heel and head posts were made of iron with rounded edges, all that can be desired is at once accomplished. The author humanely hints that much infliction of suffering would be prevented if these posts and all door posts had their sharp corners taken off. Another important suggestion is that the stall boards should be fitted loosely in the grooves of the posts so that they can be removed for cleansing, &c. All corners, as those between the walls and floors, facilitate cleaning if rounded off in concrete and cement. Coming to mangers or feeding troughs, the high manger is preferred to that resting on the floor; cast iron and earthenware are both used, and the water-trough should be provided with a tap from an overhead water-pipe. Houses for fattening cattle are thoroughly discussed, and the plans known as the “stall-feeding system,” the “box” system, and the open court and shed are described. These plans are the results of experience in accommodating cattle to be fattened for the market, and are roughly divisible into two classes. First, those in which the animals are confined to a limited space, as in the stall and box; and second, those in which space is given to allow them freedom of movement, such as the “curtain,” and open court, and shed system. The author quotes various authorities on each side, but it certainly appears to us to be a species of cruelty to adopt the cramped stall plan in preference to the “loose box” or “open court and shed system,” while economically the latter plan is quite as cheap as the stall. Various plans are given, illustrating the different systems. Thus the boxes may be arranged in double stall fashion, with a centre feeding passage under one roof, and with the turnip store at the end, or on each side of the straw barn. The boxes are usually 10ft. square or 12ft. by 8ft. The open court plan consists of a square-walled court about 36ft. square (if intended for six animals) with a lean-to shed on one side 10ft. wide, both concreted and drained, the turnip store occupying a central narrow shed between two such blocks. The “hammel” plan consists of a smaller court and shed intended for one animal, but in both systems it seems to us the animal has a natural freedom—can feed himself or drink when he desires, and keep his body in a more even temperature than possible in a close byre. At least, the

* Practical Architecture, as Applied to Farm-buildings of every Description. Profusely illustrated. By ROBERT SCOTT BURN, Farm Architect and Engineer. London: The Country Office, 170, Strand.

testimony quoted in favour of the open hammel as the more sanitary condition is overwhelming.

We pass over some sensible remarks on stable arrangement, and we are glad to find it stated that the balance of modern opinion points to a feeding passage at the back of stalls as a far more reasonable mode of replenishing or cleaning the manger than the old-fashioned one. Another point we may note is that 18ft. is the least width with such provision. Plans of a double arrangement similar to the cattle houses are given. Speaking of sanitary details, iron fittings and non-absorbent walls, or glazed-tile-lined walls are, of course, spoken of approvingly, and a kind of window in which the lower half is hinged like a casement and the upper half pivoted or hinged at bottom, is recommended. Rounded edges to doors and door jambs and fittings, flush bolts and latches, doors opening outwards, and a good width—the minimum stated is 3ft. 9in. by 7ft. 6in.—are, or should be, almost unnecessary precautions to be insisted on. As regards ventilation, the open louver-bearded ridge ventilating roof is now acknowledged the best, and the author concurs in the commissioners on barrack recommendations in these respects. The plan in favour is a double-stall arrangement, with a wide centre dunging passage between, open drains and channels being preferred. For the ingress of fresh air, ventilating bricks, 9in. by 6in., may be introduced between every two stalls, the air being conducted near the floor. We are sorry the author should have given the architectural details, as they are below criticism. The arrangement and construction of piggeries, sheep shelter sheds, poultry houses, and barns are subjects into which the book under notice enters, and some very good hints are given on the details of barn construction. As regards barn doors, the sliding system is coming largely into use, the door being suspended with rollers upon a rail at the top, along which it runs or is made to run upon rollers and a bottom iron rail. Corrugated iron doors are better and more economical when thus made. Concrete floors are also new generally esteemed for corn barns as being vermin proof and more economical, and various methods are detailed by which the cunning and perseverance of rats may be thwarted. Thus rats will often burrow from the outside round the bottom of the footing of wall, but if a course of stone be built into the wall below the ground and project a few inches, their progress will be obstructed and they will retire. A layer of concrete inside or outside the footings will also form a good check. Another good plan is to groove the board or concrete paving into the wall. Again, a useful kind of check is to hang cast-iron or zinc hoods or caps, with a projecting outer lip bent downwards, placed over the door steps and window sills, so as to stop the entrance of these rodents; and the timbers of the roof at their junction with the wall, such as the rafters and principals should be bedded in hard-setting mortar, and the corners cemented. Referring to the designs and plans given for country houses and cottages, we may say this is the least successful part of Mr. Scott Burn's little treatise, and his book would have been equally valuable without this section. The author prefers what he calls the "break and projection" type of house as the most economical, and this type forms the ornament to the cover of the book. We should rather call it the cruciform type, but we are not disposed here to controvert the merits of this arrangement. In the other parts of the book the author has furnished a fund of very useful data, to which the builder of farm-steadings may refer with profit, and we can with confidence say that every detail modern improvement can suggest will be found discussed.

PROPOSED NEW METROPOLITAN ROUTE FROM THE SOUTH TO THE EAST-END.

PROPOSALS for relieving the traffic over the Thames from north-east to south-east continue to be made, and we have already noticed one or two schemes. We have now another idea proposed by Mr. H. J. Lanchester, architect, of Abchurch-yard, Cannon-street, and that is to form a new route, chiefly for heavy goods traffic between the south and east of London, so as to divert it from the main

city streets. The idea is a good one, for we have all along considered that if the heavier traffic could be separated from the lighter or passenger traffic by a distinct channel, much of the overcrowding of our city thoroughfares, at their crossings especially, would be avoided. The author of the scheme before us observes with truth that the requirements of pedestrians and carriage-passengers have not been considered, although forming the most numerous portion of the traffic. At the crossings in King William-street and Prince's-street, Cornhill and Gracechurch-street, the congestion of both kinds of traffic is becoming daily greater and more dangerous, and the reason undoubtedly is mainly owing to the crossing of traffic running east and west with that north and south. The new route commences on the south side in the High-street, Borough, a little to the south of the junction with Southwark-street, passes through the Borough-market, crosses the Thames by a low-level bridge between Cannon-street railway-bridge and London-bridge, and terminates at Upper Lower Thames-street, at a point 100 yards east of the Cannon-street Station, at which junction a square is proposed of sufficient size to allow the traffic to pass freely east and west into Thames-street, which thoroughfare eastwards is proposed to be widened to an average width of 60ft. on the north side, diverted slightly to the north at the east end of Custom-house, by a new roadway into Trinity-square, avoiding the steep rise of Great Tower-hill. This route is shown to end at the Mineries, where the traffic will become dispersed into the main eastern thoroughfares. There is something to be said for this proposal, and the principal feature in it that commends itself to us is that it provides a separate channel for the heavier part of the traffic from the Surrey-side to the London Docks and East-end. The approach to the proposed bridge ends at Thames-street, and there is no direct access through into Cannon-street, so that the traffic going east or west will not be interfered with. The new route passes Billingsgate-market, the Custom-house, and Coal Exchange and various depots of manufacture and trade, and provides access to the docks, and the manufacturing establishments in the East of London. At the same time, would not a bridge at the Tower site give better facilities (by obviating the detour westwards) than that sketched? As regards the figures quoted by Mr. Lanchester—viz., that the average traffic per day over London-bridge is composed of 7,800 vehicles devoted to goods traffic, they certainly appear to lend support to a bridge further eastwards than that shown, especially as the greater part of the goods traffic is acknowledged to move in an easterly direction. Indeed, we hardly think a bridge in the situation shown, so near London-bridge, would be an improvement. If the East of London and its heavy traffic are to be relieved, why not boldly construct a bridge in the direction of the greatest need, instead of crowding up the river above London-bridge? Into the details of the scheme it is unnecessary to enter, though the author shows that the gradients of the new route would be very easy—1 in 55 on the south side, and 1 in 60 on the north—and compare favourably with the gradients to the approaches of London and Southwark bridges, which range from 1 in 22 to 1 in 34. We may add a lattice-girder bridge is proposed, 42ft. wide, of low level, and having a headway above Trinity high-water mark of 23ft. in the centre. No cost is stated; the approaches would run into a considerable sum, but with any scheme the item of purchase would be largely compensated for by the creation of business frontages.

METAL BAR & IRON BRIDGE STRESSES.

IN a paper printed in the transactions of the American Society of Civil Engineers, read by Mr. Theodore Cooper, C.E., member, some remarkable experiments are recorded upon steel bridge links. The writer noticed accidentally that the link heads, while being tested, exhibited peculiar markings due to the cracking of the scale while under the test. A closer examination convinced him that these markings indicated the mode of transfer of the stresses about the pin-hole, and throughout the head of the bars. It appears the links were of

steel, known as "Hay's steel," and were forged from solid billets by Messrs. Hussey, Howe, and Co. The section of one link in the body of bar was 3in. by 1½in., and that of heads 7½in. by 1½in.; the length from centre to centre of pin-holes, 2ft. 9in.; diameter of pin-holes, 3in. At 43,350lb. per sectional inch the scale began to fall off from body of bar, and the markings appeared. Another test on a duplicate link indicated very similar results. No permanent set was visible at 40,000lb. per square inch; the scale commenced falling at 45,700lb. At 47,000lb. per square inch distinct lines appeared upon body of bar. Relaxing the strain it was noticed about 2in. of the bar was distinctly marked with diagonal cross lines at 45° (as well as could be judged) to the line of bar, and these markings were visible upon all its four sides, the number of lines being about five to the inch, measured perpendicularly. Sketches are given of these lines, which, in the case mentioned, form quite an ornamental band of plaid-like form round the bar. The author also refers to other eccentric lines which appear about holes punched in steel plates, and several of these steel specimens are illustrated in the paper before us. We note especially one diagram of a flat bar grooved in centre, upon which quite a symmetrical disposition of crossed curvilinear lines is shown obtained upon a number of specimens of the same shape. Though no single specimen showed all the markings here given, each showed a portion, and these have been combined in the diagram before us. In the centre on both sides of the groove or notch, the lines represent intersecting curves somewhat like the pattern on engine-turned watch-cases. These appear first at about 40,000lb. per square inch on the grooved section. The markings about the pin-holes, near the end of bar were obtained at or near the rupturing point usually from 89,000lb. to 95,000lb. per square inch. The lines produced from shearing a steel plate are indefinite, showing the different kinds of strain due partly to shearing and partly to bending. These lines, it is noticed, cross one another at right angles, and are at 45° to the line of applied stress. The author thinks the direction of the transferred stresses upon these specimens are at 45° to the markings. Into the discussion that follows we cannot here enter, but simply remark the conclusion arrived at. This is, that the scale markings are lines of greatest shear, lines along which the metal slides to restore an equilibrium between the applied and resisting forces or lines of flow. The principles being accepted, the author concludes by asking whether we cannot plot the lines of transferred stress from these markings by drawing a resultant line of 45° to the several lines of shear, or that transverse dimensions may be taken so uniformly that the shear will be uniform throughout, and the form obtained be of equal strength at all parts.

In another discussion on the "Relative Quantities of Material in Bridges of Various Height," at the tenth annual convention, upon Mr. Emery's paper—a notice of which was given in the BUILDING NEWS of last year—Mr. W. H. Searles made a remark which corroborated the theory that high-trussed bridges were the most economical. The speaker referred to the Erie Canal bridges, designed by Mr. Squire Whipple, with a small height of truss, which were wearing out so rapidly, especially in the lower chord, from decay, that iron chords had to be substituted, the other parts being rebuilt in wood. Mr. Searles discovered that the low truss required an excessive amount of iron in proportion to the rest of the bridge. He thereupon raised the truss from 7 or 8ft. in a span of 80 or 90ft. to 16ft., with the object of reducing the cost of the iron chord. The author found from Mr. Emery's data that 16ft. was the most economical proportion at the then prices of wood and iron, comparing the cost of the 8 or 9ft. truss with the 16ft. one, and he found that in a small bridge of a single roadway, there was a saving of about 100 dollars. The increased height necessitated counter-bracing of every panel, and a system of overhead-bracing was also required, but the result is stated to be very satisfactory, and the bridges are crossed with a greater sense of safety than the lower-trussed ones.

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ILLUSTRATIONS.

DETAILS OF ST. MICHAEL AND ALL ANGELS' CHURCH,
TURNHAM-GREEN.—HOUSE AT CLAVERTON.—SOUTHPORT
GLACIARIUM.—WINGFIELD MANOR, DERRYSHIRE.—CHURCH
OF ST. BARNABAS, BECKENHAM.—ALL SAINTS' CHURCH,
STOKE NEWINGTON.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SOUTHPORT GLACIARIUM.

This glaciarium has been erected to provide for the rapidly-growing town of Southport a cold store for the preservation of meat, also a manufactory for pure ice, and the largest sheet of ice for skating that has ever been produced by artificial means, which will add much to the attractions of this favourite seaside resort. The skating hall is 160ft. long \times 64ft. wide, the area of the ice being 144ft. \times 54ft., or 7,776ft. sq. The front buildings contain large cloak-rooms, lavatories, and skate and refreshment-rooms, with a large gallery for spectators across the end of the hall. In this building are also provided, separate from the hall proper, spacious billiard, dining, and reading-rooms, with photographic studio, &c. At the other end of the building, and in communication with the skating-floor, is a beautifully-arranged fern-grotto promenade. The front is faced with red pressed bricks, carved and moulded. The engine-room and boiler-house are in the rear of the building, and contain machinery of the most improved character for the purposes of refrigeration. It is contemplated to still further extend this portion of the premises and plant. The buildings have been designed by Messrs. Bell and Roper, of the Royal Exchange, Manchester; Mr. T. Bridge, of Southport, being the contractor. The glaciarium is the property of a company formed to carry into practical effect the patents of Professor John Gamgee, and the warmest praise is due to Mr. Edward Holden, the chairman, and his co-directors, for their intelligent perseverance in the execution and accomplishment of their difficult task. The building was formally opened by Mr. Edward Holden, on Friday, the 10th instant, and on Thursday, the 16th inst., the skating-floor was inaugurated by Lord Lindsay, followed by a curling match between the Lancashire clubs.

WINGFIELD MANOR, DERRYSHIRE.

MR. LANGHAM gave some general historic notes of this mansion at the time of publishing his sketch of the porch and chapel gable. (See BUILDING NEWS for September 15, 1876, Vol. XXXI., p. 257). This bay window is on the same side of the inner court as the porch, and to the right (all the intervening wall being razed), and lighted the great hall. The jambs or side faces of the bay are not square, but slightly splayed, so that the plan is half of an irregular decagon. The door shown opens on a stair down to the finely-vaulted crypt.—W. R. LETHABY.

CHURCH OF ST. BARNABAS, BECKENHAM.

BECKENHAM is among the foremost of the rising suburbs to the south of London, and house-building has recently been carried on very extensively. Such an increase has of course necessitated further church accommodation, and it is but a short time since that we published (June 29, 1877) a view of Holy Trinity Church, a building of very considerable merit. To day we give a view of the new Church of St. Barnabas, from the designs of Messrs. Stenning and Hall, architects. We have received no particulars of the building.

HOUSE AT CLAVERTON.

THIS is a residence recently erected at Stoke Bishop, near Bristol. The accompanying drawing indicates the general style of the building. The walls are built of red bricks, and are hollow. The dressings are of Douling stone. The roof is covered with Broseley tiles. The exterior woodwork is of deal, and painted a chocolate colour. Of the interior woodwork, that in the hall, including the staircase, screens, and panelled ceiling, and that in the dining-room and studio, are of pitch pine stained (not varnished) a dark colour. The other woodwork is of common deal and painted. The terrace walls are of red bricks, some being of special make. The stabling is situated at the south-east side of the house, and is built in the same style as the house. Mr. Wm. Wood Bethell, of 19, Craven-street, Strand, London, was the architect; Mr. J. E. Davis, of Bristol, the builder; and Mr. Ed. Honey the clerk of the works.

CHURCH OF ST. MICHAEL AND ALL ANGELS, BEDFORD-PARK, TURNHAM-GREEN.

LAST week we gave the general geometrical drawings of this interesting building, and to-day we are enabled to publish several details to a larger scale, including the nave and aisle roof and benches in the nave. The drawings are carefully figured, and descriptive notes are given with the several parts, so that further description here is unnecessary. Next week we hope to conclude our series of illustrations of the church by publishing a perspective view with ground plan, a longitudinal section and details of the aisle window, buttresses, &c. We understand that a parsonage house is to be built adjoining the church. Mr. R. Norman Shaw, R.A., is the architect of all the buildings on the Bedford-park estate.

ALL SAINTS' CHURCH, STOKE NEWINGTON.

THIS church is situated in Aden-grove, Stoke Newington, and was erected a year or so since from the designs of Messrs. Francis T. Dollman and William T. Allen, architects, of the Adelphi. We publish a general plan with the view, but no particulars have been received from the architects. Our illustration is taken from the drawing which was last year exhibited at the Royal Academy.

SCHOOLS OF ART.

GLASGOW.—The annual meeting for the distribution of prizes in connection with the Glasgow School of Art and Haldane Academy was held last week in the Corporation Galleries. The annual report of the committee of management stated that for 1877 the number of students was 1,167, and for 1878 1,003. Of these 322 presented themselves at the local examination, of whom 144 passed. The branch school in the East-end had been well attended. The financial position of the school was fairly satisfactory, but the committee noticed with regret a decrease in the amount of subscriptions.

COMPETITIONS.

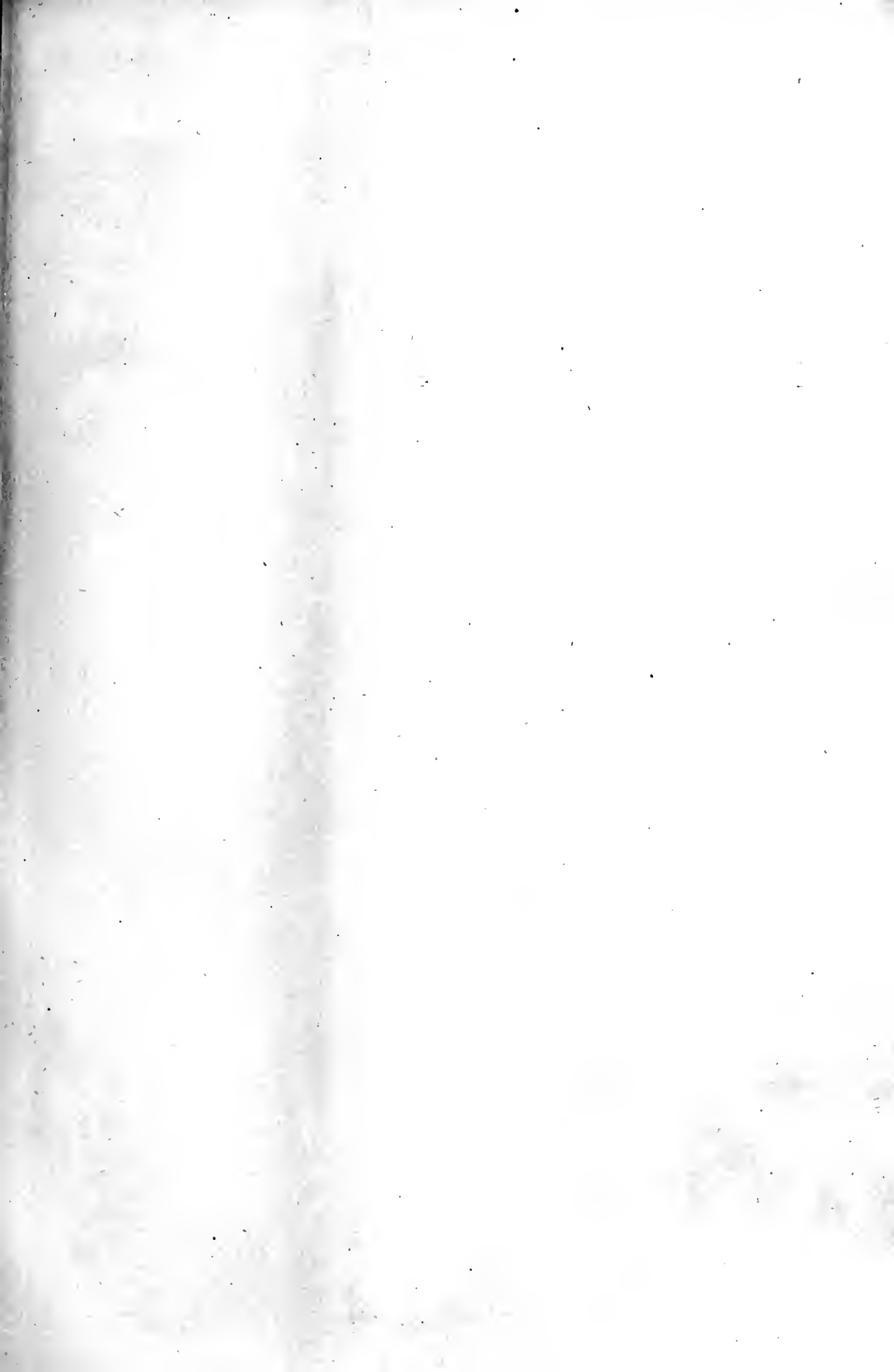
HALIFAX.—At the last monthly meeting of the Halifax School Board a report of the board in committee was presented, showing that at a meeting on the 13th of January, at which nine members were present, the plans selected from 92 competitors for the erection of a higher board school were those submitted under the motto "Seal of the Board," the second premium of £25 being awarded to the author of the plans under the motto "Prussian." The sealed envelopes accompanying the plans having been opened, it was found that Messrs. Leeming and Leeming were the authors of the plans under the motto "Seal of the Board," and Mr. Richard Hershall of those under the motto "Prussian." It had therefore been resolved in committee to authorise Messrs. Leeming to obtain tenders for the works required to be done in the erection of the entire school, according to their plans, and also for the erection of one department only. Mr. Ramsden inquired how the voting was in committee upon the subject, and in reply the clerk said there were five in favour of the report, three against, and one neutral; whereupon a discussion ensued upon the motion of Mr. J. W. Longbottom, seconded by Mr. D.

Hitchen, that the report of the committee be adopted. Mr. Ramsden thought, and he was supported by the chairman, that the majority of the board in committee was not a sufficiently preponderating one to warrant an immediate acceptance of their decision, and he suggested a reconsideration of the matter. After an opportunity had been given for the expression of opinion upon the subject, Mr. Longbottom replied, and characterised a reconsideration of the plans after their authorship was known as a proceeding which would not be endorsed by any honourable man. Ultimately the resolution that the report be adopted was put to the meeting with the following result:—For, Messrs. Longbottom and Hitchen; against, Messrs. Swallow, Snowden, and Ramsden; neutral, Messrs. Riley, Storey, and Drury. The motion was therefore lost, and the board resolved itself into a committee. If the recommendation of the committee is adopted finally it seems a pity that 90 architects have been put to trouble and expense for nothing. The two successful Halifax architects might just as well have been applied to at first.

ARCHÆOLOGICAL SOCIETIES.

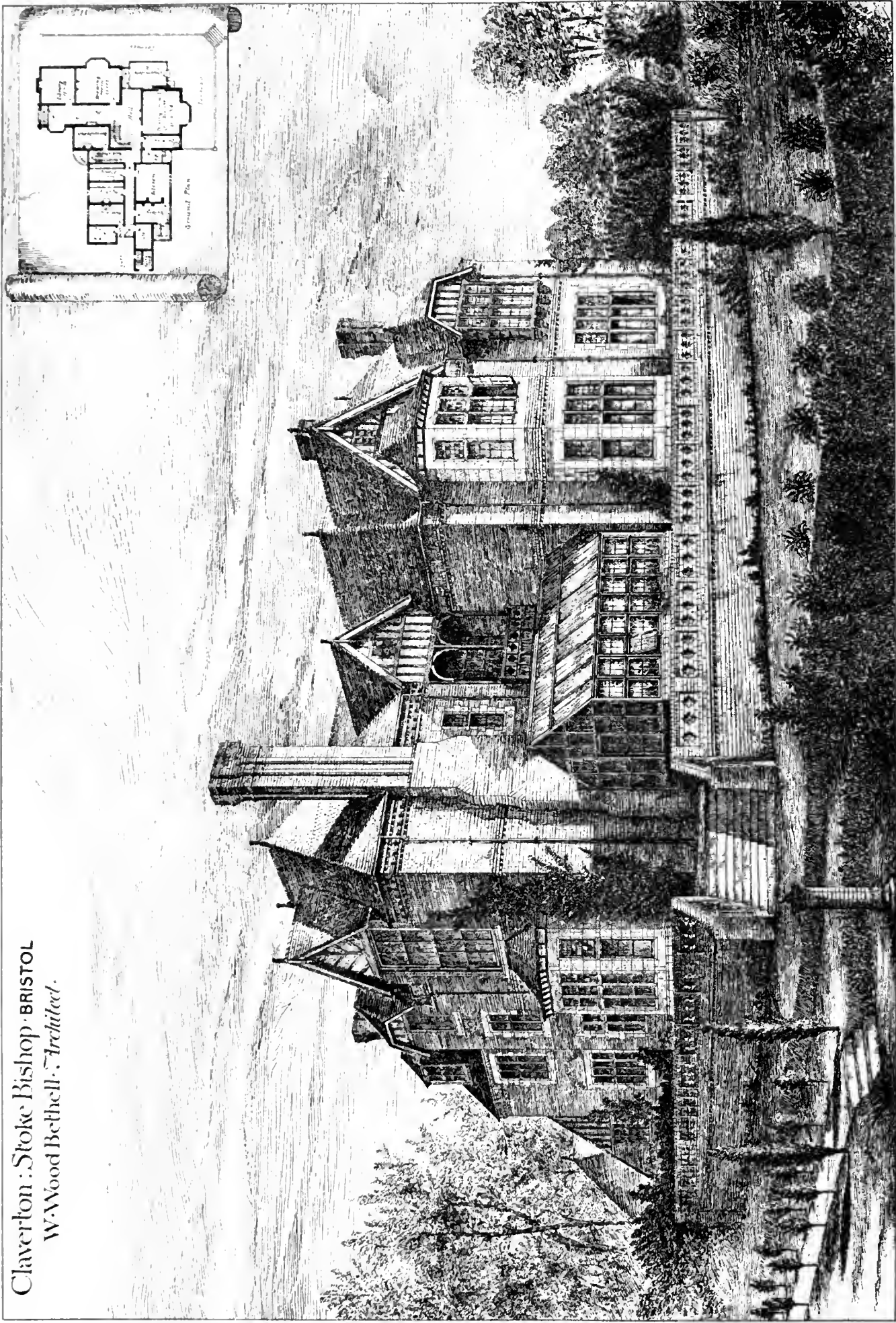
BRITISH ARCHÆOLOGICAL ASSOCIATION.—The third meeting of the session was held on Wednesday last; Mr. Thos. Morgan, in the chair. The Rev. Mr. Chandler reported the discovery of the altar slab of Waterbeach Church. It is of grey marble, and has been supported by six pilasters, fragments of which were found. The peculiarity was noticed of the usual 5 incised crosses appearing on what seems always to have been the under side of the slab. Dr. Woodhouse, as a warning to antiquaries, exhibited a large collection of forged articles, the work of the firm of "Billy and Charley," whose productions were more frequently met with a few years ago. Mr. Loftus Brock, F.S.A., described an African jug of modern date, but having the form of colouring of early times, being an example of the continuance of ancient types in the country. Mr. Gordon Hills reported that several fragments of Roman date had been found in Chichester Cathedral, indicating the prior existence of Roman buildings on the site. He exhibited red tesserae and Samian ware, and spoke of flue tiles having been found. Mr. Hills then read the first paper, descriptive of the recent discovery of a remarkable series of earthenware vessels at Leeds Church, Kent. They are built up over the arches of the nave, and were inserted probably in the belief that they would help the acoustic effect of the building. The arches are of 15th century date, but the jars appear to be older. The subject of acoustic pottery in churches was dwelt upon at length. Mr. R. Blair described a great number of small articles carved in jet, found on the site of the Roman station, South Shields, and which are very peculiar in form. Mr. de Grey Birch, F.R.S.L., commented upon the peculiarities of the inscriptions. Mr. Roach Smith, F.S.A., reported the discovery, in the Allier, of the site of a Roman manufactory of small statuettes of white clay, and exhibited a series of photographs of the most interesting. These articles are of rare occurrence in England. Mr. Morgan read the second paper, taking for his theme the positions of the Roman armies in North Britain in the second and third centuries—the positions being indicated by numerous evidences which were passed in review, while recent discoveries were mentioned which afford additional information. The third paper was by Mr. W. C. Little, who traced the course of a Roman road across the Cambridgeshire fens, and described its construction of gravel upon a layer of branches. It is generally 25ft. wide.

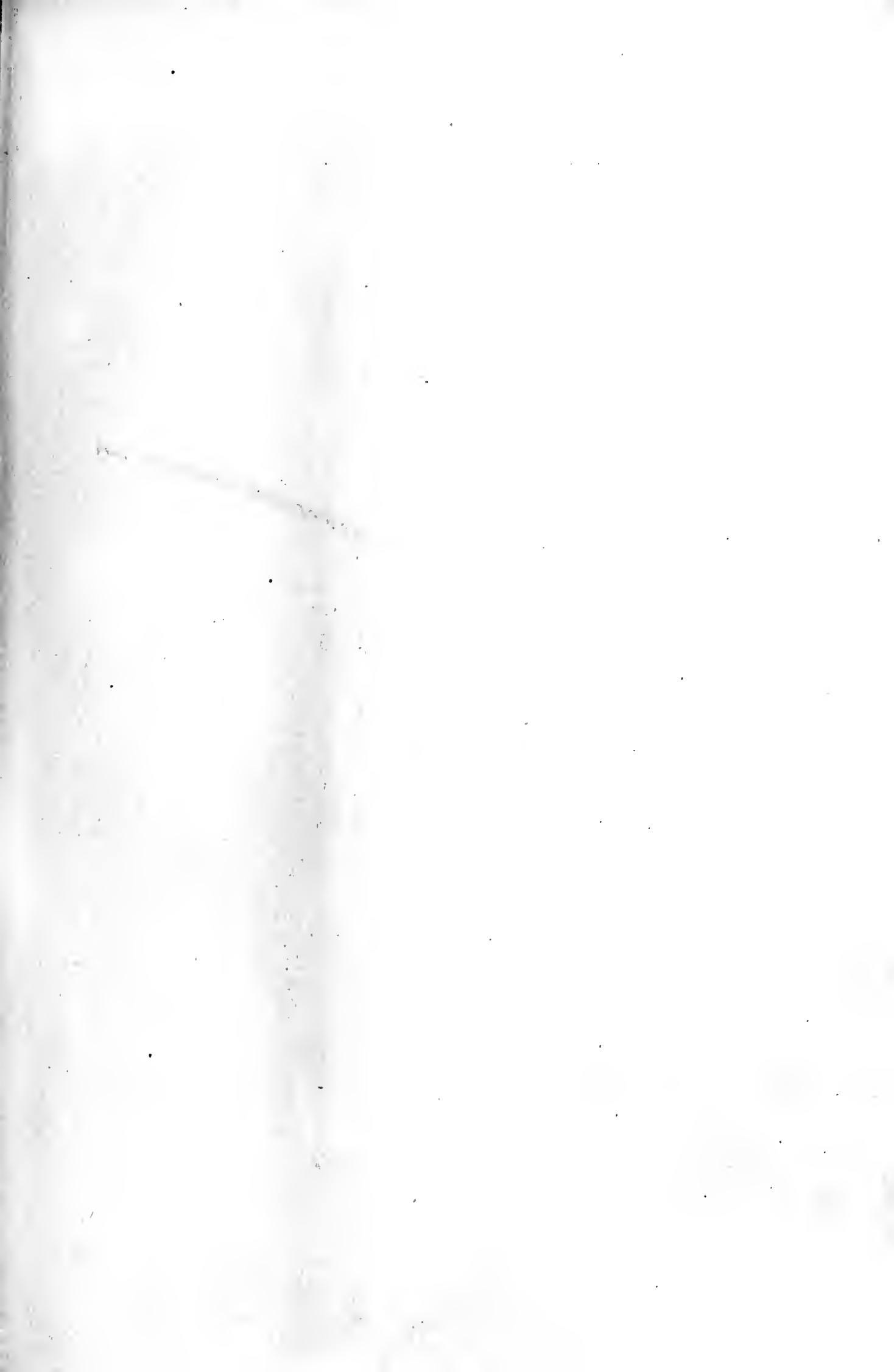
The death is announced, at the age of 74, of Mr. Henry Nelson Hughes, builder, of Wrexham. He was largely concerned in erecting houses for the working classes, and built a number of dwellings of this character in Springfield, Rhondda, and subsequently bought a quantity of land in the hamlet of Rhoscerney, which he covered with houses. At the time of his death he was in association with his son, Mr. Charles Hughes, erecting 45 houses between Rhondda and the railway station. Mrs. Hughes died on the following day after her husband, and was buried in the same grave.



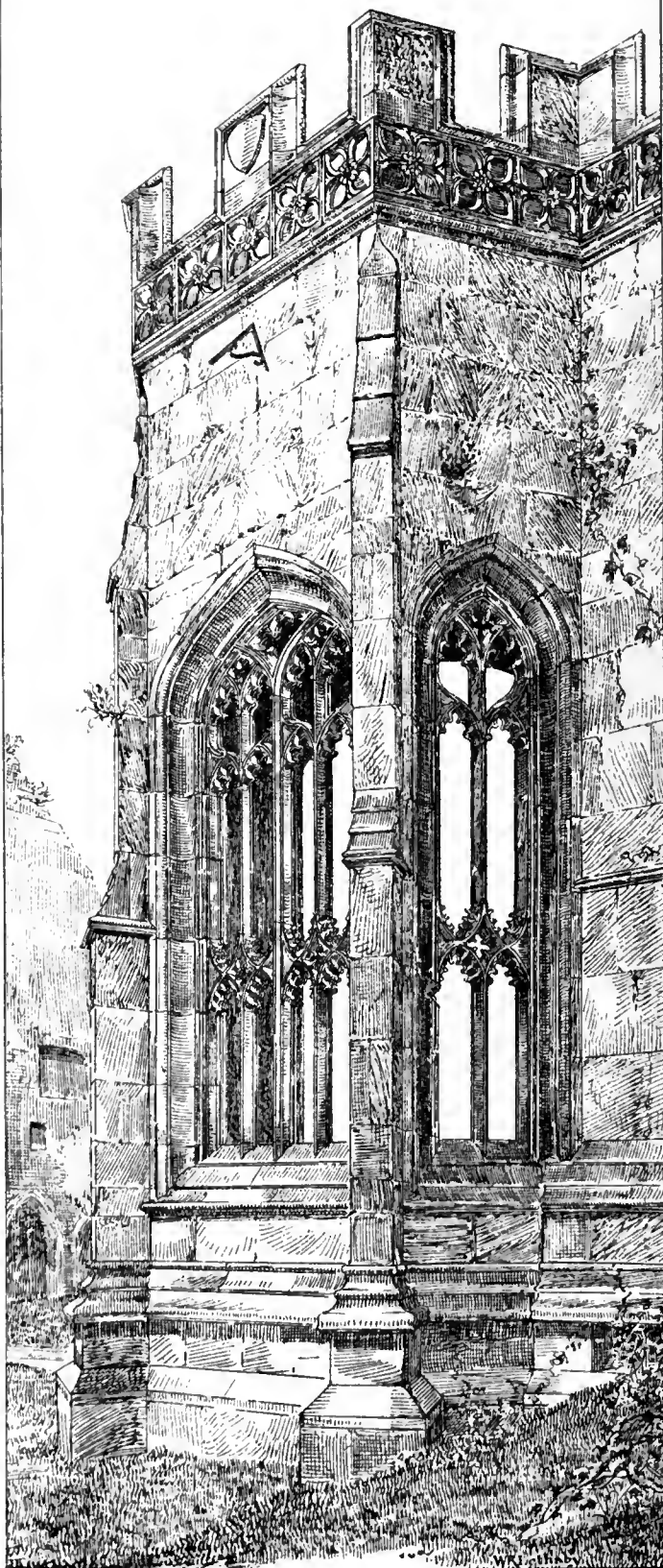
THE BUILDING [REWS, JAN 24. 1879]

Claverton : Stoke Bishop · BRISTOL
W. Wood Bethell : Architect.



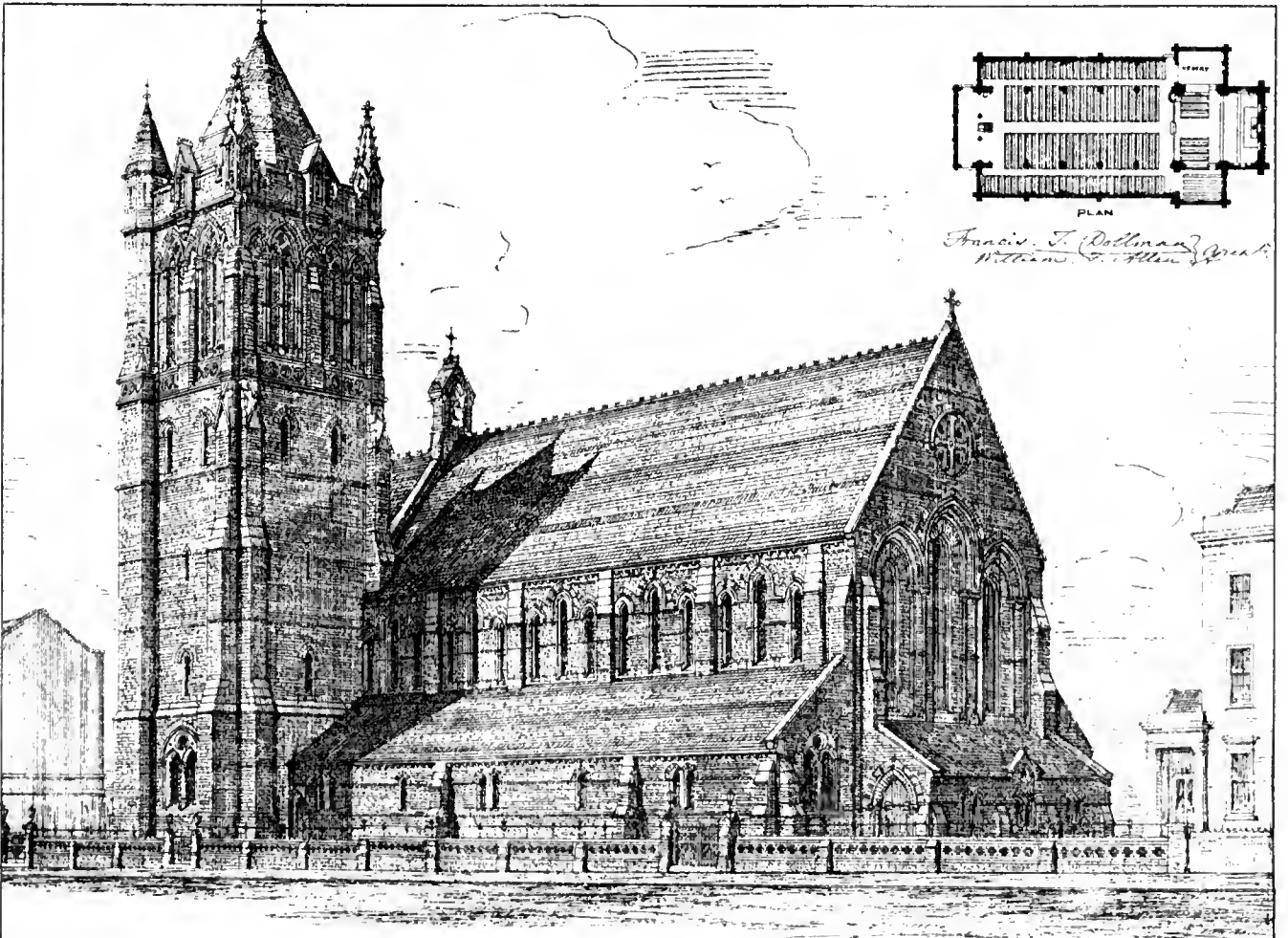


WINGFIELD MANOR DERBYSHIRE



S. BARNABAS BECKENHAM

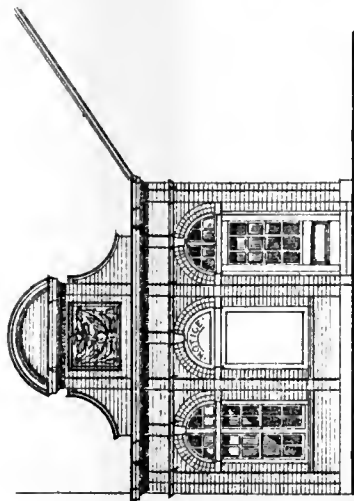
ALEX. GUSTENING
AND HENRY HALL, ARCHT^S



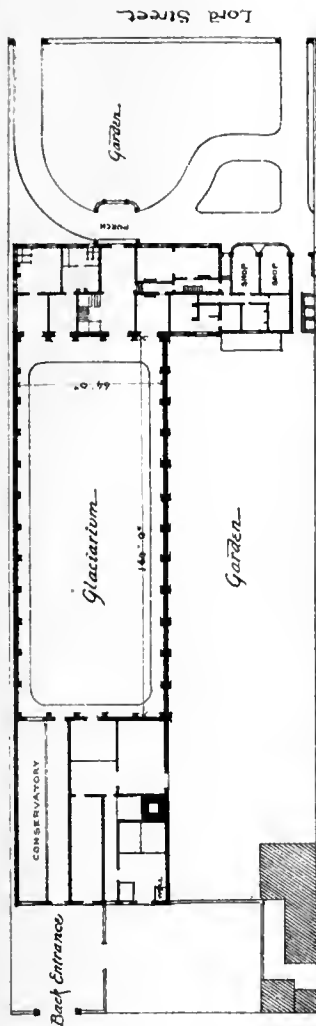
*Southport GLACIARIUM and Ice Manufacturing Company's
New Buildings erected for the above at SOUTHPORT:*

Architects: Messrs. P. Bell & G. Freeth Roper:
Architects, MANCHESTER.

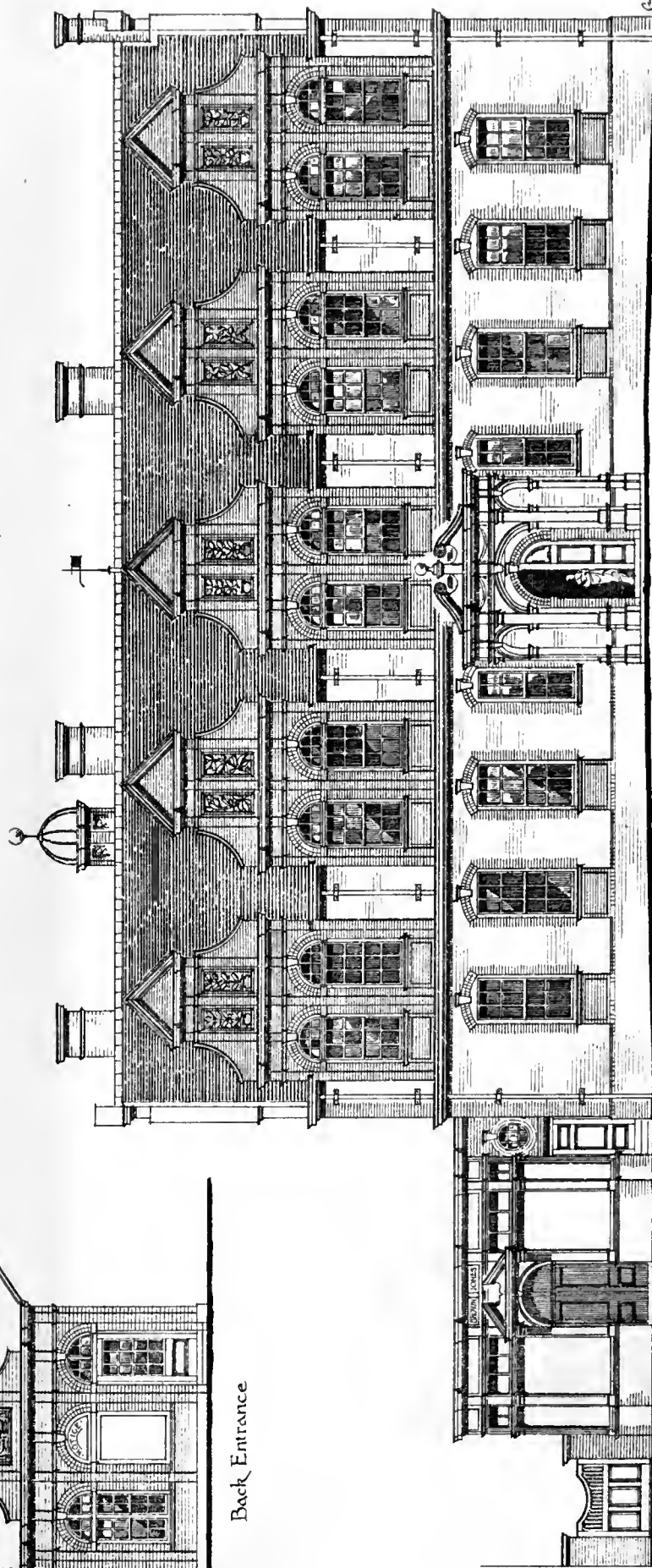
January 1879.



Back Entrance



Ground Plan of Glaciarium &c.



Elevation of Shops & Glaciarium facing Lord Street.
Principal Entrance to Glaciarium

Entrance to Garden Entrance to Shops Entrance to House

Scale of Feet

10 20 30 40 50 60 70 80 90 100



BUILDING NEWS DESIGNING CLUB.

A WAYSIDE INN.

THIS subject has taken well with our contributors, and we have some fifty designs, all bearing marks of study and painstaking effort, and some of much merit. We did not propose any condition as to cost in the present instance, but left every competitor to work the problem out himself. Many of the designs give us rather more of a suburban hotel or public-house than an unpretending wayside inn, and for this purpose or for a village inn they are suitable. Four or five designs closely contest the prize, but after due consideration of the conditions we have decided upon placing the design under motto "J., New Year's Day" as the first. Its unpretending and picturesque elevation is not, however, its chief merit. It is compact, cosy, and economical in plan, and it covers less area than most of the other plans which run it very close. The ground plan bespeaks the purpose; the lobby is sufficient, and opens into a taproom, well lighted in front, with seats round the walls. On the right is a small bar—not a tavern or railway buffet—served from a short corridor inside, which gives access to a snugery, a kitchen, and mainly to a bar-parlour in front; the latter is of good size, with a wide and well-lit bay and an angle fireplace placed in a convenient position for the comfort of wayside travellers. The conveniences are well placed, and the bedrooms small but sufficient. The author has simply treated the exterior in brick and tile, but has made a feature of the doorway and bar window which places it out of the rank of a cottage or dwelling-house. The tile-hung walls and the bay with tarred timbering and plaster above are pleasing and homely-looking. The next design, "Mechlin," we had intended to give the first place for its even more expressive inn-like character. No one can mistake it for anything else; its two end projecting gables timbered, and its bracketed gallery between, its spacious entrance and bar window are very characteristic of the public-house, and the drawings are carefully and cleverly executed, but the ground plan savours too much of the hotel in its dimensions and completeness. There was scarcely any necessity for a side tap entrance; the offices are not very conveniently planned in relation to the bar, and the rooms are larger than required for the chance custom of a wayside. The author says in a note, "Bar accommodation is only provided in connection with the taproom and skittle-alley, the better class of customers generally using the bar-parlour." The remark applies to a village inn. "Yesram" sends a more compact plan, but fails in the elevation. The bar has a counter cutting off quadrant-fashion the corner of the space—a mode of accommodation more suitable to and suggestive of a railway tavern. The bar-parlour and smoking-room are conveniently placed on each side, and the private part of the house is well cut off from the public portion. There is a side entrance for skittle-alley. The elevation reminds us too much of a fancy suburban tavern or a cottage *ornée*, and the entrance has a private air of seclusion, hardly characteristic. "S" in circle falls into a similar mistake in his elevation. Uncommonly pretty, neat, and nice, as a country lodge or residence, it is much too fanciful to be built by some desolate country roadside, with but little to set it off in the way of buildings. The chief fault we find with the plan, otherwise good, is the draughty passage and cramped stairs. The drawings are cleanly and neatly done, and the estimate at 7d. is worked out at £1,366. "S." is one of the few competitors who have furnished an estimate. "B" in circle is a cleverly drawn and pleasing cottage-like inn, the entrance being up a few steps under a sheltered lean-to of the roof placed sideways. The idea is certainly pretty and cosy, and the plan is skilfully managed as regards the bar and entrances; the bar parlour is approached through the bar—not perhaps desirable—and the smoking-room and dining-room would have been better thrown into one. The rooms are rather small. Another clever but misapplied study is "Triangle" in circle. It certainly lacks one essential, and that is character. Its elevation looks far more suitable for a builder's residence, with yard and workshops attached,

than a wayside tavern. It has a rather monumental doorway, and the style is more suitable for a stone district. The plan lacks invention and fitness. The kitchen is too far away from the bar, to which it has no connection, and the bar-parlour and smoke-room scarcely enjoy that privacy and immunity from the inquisitive eyes of the barmen or barmaids which a hungry wayfarer would look for. The straight passage divides the house uneconomically, and the idea of a town house is uppermost. A stable entrance is shown. "Omega," as usual, sends some well-designed elevations, pleasing in detail, but the plan has a crowded and confused look about it that almost defies unravelling. In the first place we do not see very clearly how the hall is to be lighted, except through the screen of bar; another fault is the distance from kitchen to bar, while the tap-room is too much cut off from the bar. Externally the design is suitably treated. "Omnia Vincit Labor!" This is a plan which scarcely seizes the main points; the bar is a mere cupboard-room, with small serving hatches between hall and bar-parlour; the kitchen is not in direct communication, and the arrangement is more fit for a village inn than a roadside. Externally the grouping is somewhat heavy and the treatment is too domestic for a public-house. The building is cubed at 7d. = £1,537. "Enigma" has some good points, such as the arrangement of bar and parlour, and the elevation, half timbered, is more suggestive of an inn than many others, but the communication between kitchen and bar is not handy. "J. S." is a carefully drawn elevation, but it becomes more a cottage *ornée* or a gentleman's lodge than a wayside inn. The plan reminds us of many railway hotels, and there is a want of fitness evident. "Fritz" seizes the idea, and his plan is not without merit, especially in the arrangement of bar and kitchen offices; but the roof is heavy, and the end elevation not happy. The author of "Be to its merits very kind, and to its faults a little blind" has sent a very detailed and elaborate set of drawings, in which flues and joists are shown—a work of supererogation on his part, the labour of which would have been better bestowed probably in improving the plan. One fault to which we can hardly be blind is the large bar and counter, and the want of communication between latter and kitchen. The elevation expresses its character, and the ample notes and scantlings interspersed—if unnecessary for our purpose—show at least a knowledge of detail and practical requirement that is commendable. The detail of chimney-piece is not without merit, but too elaborate, and the side ramps would have been better omitted. Many of the designs, in some respects clever, err in showing the arrangements of small public-houses. Among these we may place "Con Amore"—neat and typical in elevation, "Y." in circle, "Che Sara Sara," "M." in leaves, "Spero Meliora," "Herat," "Such a Dog," "Bad Attempt," "Cyprus," "Tam O'Shanter," "Anchor," "Nemo," a design with no motto, initials being A. W., Leeds, "Signum," and "Octagon." Many of these are creditable as elevations, and the drawings are meritorious; but in every case the author has aimed at a suburban hotel, or a class of building which we are accustomed to designate by the name of "railway hotels." In some of these there is a want of suitability both in plan and elevation. "Tam O'Shanter" is one of the best, though we cannot particularise the merits or defects in every case.

The other designs we have received partake more of private houses in plan and external treatment. We may name in this category "Ivy Leaf," in which the timbering is shown in a fashion that is more singular than beautiful; "Ich Dien," "Corona," "To be or not to be," "Spider," "Primo," "Star" in circle, "One of them," "Stefano," "B. M. W.," "Try," "Anchor" in circle, "En Avant," "W." in triangle, "Peter," "Ogmore."

DINING-ROOM BUFFET.

Of these designs the one with motto "J." is the simplest and most effective. The plan is canted at the ends, and there is no exaggerated or strained effort to produce quaintness or ornamentation. Below the buffet top the doors are framed in Japanese fashion—the panels

being enriched by painted plaques with heads, the surrounding panels having stamped crimson leather, and the mouldings being gilt. The dresser top has a back of bevelled mirrors—the upper lockers being carried by turned balusters at the angles. At the top of lockers is a railed shelf for porcelain, &c. The whole is proposed to be executed in English oak, unpolished, and gilded in the principal mouldings. The latter are in good taste, and there is refinement in the detail generally. In "J'Espere" we recognise a well-known hand. The design is a clever one, with a certain admixture of Japanese detail. There are three cupboards below with bamboo framework and tinted glass panels in lead. The centre opening has a curtain. Above are three drawers, and above the shelf is a simply-treated top, with shelves for *bric-à-brac*, and bevelled mirrors below. The ornament is proposed to be executed in black line, the centre cupboards being painted. Simplicity and breadth are somewhat sacrificed, though there is evident merit in the composition. We do not admire the finish of the uprights and cupboard stiles, which have a rather awkward appearance. The design "Memor Esto," has much simplicity about it, and there is a quiet Renaissance feeling throughout. There is a centre cupboard, a coved recess above the table top, with shelf above. The details are not equal to the design. "Frappe Fort" sends a rather ordinary-looking design, marked by a few good points—such as the cupboard details, the rack below, &c. The ornament proposed is appropriate, and there is the merit of simplicity in outline. We are glad to see "East Anglian" stand so well this time. His design is certainly quiet and dignified, and the detail markedly in advance of former efforts. Some good detail is observable on "Be to its merits very kind," &c., and the author has figured in the sizes of every part. We do not like the pointed-shaped legs to the upper shelves, and the centre panel is too cut up. We can only further name in order of merit a few others—"W. J. M.," "Burswell," "Try," and "J. S."—and in these we find evidences of improvement, though the prevalent weakness is attempting too much.

THE R.I.B.A. AT THE CRITERION.

ON Monday morning last, in accordance with the request of the President of the R.I.B.A., Mr. Verity, the architect of the Criterion, attended at that building to meet members of the Institute, so that the several details and arrangements of the various departments of this large restaurant—described by Mr. Verity in his paper before the Institute on Monday, the 13th—might be seen in working order previous to the discussion on the subject at the Institute's next meeting. The few members who attended the visit were amply repaid by what they saw, both in the Criterion and its theatre, as well as in the new building adjoining, which is to form so large an addition to the present accommodation. But it certainly betrays a want of taste and consideration on the part of the R.I.B.A. having—through its president—asked to be allowed to visit the buildings, that no one representative—not even the president or secretary—was present to meet Mr. Verity, and with the exception of two or three fellows, the meeting consisted of a few junior associates. At the visits of the Architectural Association care is always taken that two or three representative members or officers are present. As we have on more than one occasion described the Criterion, we need not here enter into particulars. Mr. Verity was not backward in describing any little points of failure or alteration made in the original arrangements during the six years since the opening of the building. For instance, in the dining-room on the ground floor, where light has to be obtained through the floor for the sculleries below, glass mosaic was at first used for the lights, but owing to the singular action of the indiarubber coverings to the wheels of the joint tables in continually passing over the lights, the pieces of the mosaic were picked out one by one, till only the cement filling remained. Ground glass panels have been substituted. Again, all the service as well as principal doors into the public departments were made of solid hard

woods. These used for service, where not immediately seen, might have been made in a less costly manner, seeing that the waiters generally having their hands full, invariably open the doors either with a sharp kick of the foot or thrust from the tray, so that in some cases all the solid mouldings have been worn off. The new building will provide a large American refreshment buffet and grill-room on the ground floor, and to the large hall of the Criterion on the second floor an addition equal to half its present length. On the first floor a suite of Masonic rooms will be arranged suitable for lodge and other meetings. Already the Criterion is the most important building of its kind in London, dining no less than two thousand as a minimum every day, sometimes over four thousand. When the new buildings are finished, the Criterion will be still more worthy of remark.

CHIPS.

A new school is about to be built by the Great Grimsby School Board for 750 children in the West Marsh district. It will be the second provided by the board, a former one for 1,100 having been built 18 months ago. The new school is from the designs of the board's architect, Mr. Charles Bell, of London and Grimsby.

The Richmond vestry received at their last meeting a report from Messrs. Russ and Minns, their engineers, as to the progress of the well now being sunk. They stated that the boring was now 130ft. into the chalk, but of this the last 20ft. was only 10 $\frac{1}{2}$ in. diameter, and that owing to the tough nature of the chalk they had not made the progress that was anticipated. It is now two years since the Southwark and Vauxhall Water Company cut off the supply, and in the interim the townspeople have been supplied from springs in the Petersham meadows.

The Merthyr Local Board have adopted the design of Mr. Dyne Steel, M.I.C.E., of Newport, for a new iron bridge at Troedyrhiw. The bridge will replace an old one of the same span, and will have a buckled platform, on which will be laid coal-tray, concrete, and road metal. The tender of Messrs. Tangye Brothers and Steel, of Newport, has been accepted for the execution of the work.

On Thursday week an inquiry was held at Cinderford, before Mr. J. Thorahill Harrison, C.E., Local Government Board inspector, respecting an application from the Westbury-on-Trent Sanitary Authority for sanction to borrow £1,800 for works of sewerage and water supply at East Dean. The proceedings were marked by several scenes, warm opposition being raised by some of the East Dean ratepayers to the scheme, the chief objections being the cost and the position of the outfall works.

A South Wales journal says that the last remains of the ruined College of St. Illtyd, at Llantwit Major, consisting of a triple archway leading out of a small covered area in a garden on the north side of the parish churchyard, have been reduced to a shapeless mass by the frost and snow of last week.

Mr. Brock, of London, has been commissioned to execute a statue of the late Lord Chief Justice Whitehead. The memorial will be erected in the Hall of the Four Courts at Dublin.

The Corporation of Preston have invited tenders for lighting the market-place and other open spaces in that town with the electric light.

A Local Board is to be formed for Hailsham, East Sussex.

A large railway hotel was opened last week near Brundish Station, between Yarmouth and Norwich. The architect of the house, which is known as the New White Horse Hotel, is Mr. A. J. Lacey, of Rampant Horse-street, Norwich, and the contractor Mr. John Withers, of Blofield.

A stained glass window to the memory of the Ashley family has been erected in Llaniton Church, near Oxford. The central light depicts the "Ascension." On the one side is Moses lifting up the serpent in the wilderness, and on the other the Saviour on the cross. The work has been executed by Messrs. Jones and Willis, of London.

The Hove town commissioners have instructed their surveyor (Mr. E. B. Ellice-Clark) to commence sewerage works at Hove-drive, and also to proceed with the new Medina groyne.

New Board schools have been erected in Surrey-road, Norwich, for the School Board of that city. Mr. J. H. Brown was the architect, and Mr. J. W. Lacey the contractor. Another school is to be built for the Norwich School Board in Crook's-place, from the designs of the same architect.

Plans have been received by the guardians of Middleton Union, Co. Cork, from Mr. A. Hill, of Cork, their architect, showing proposed reconstructions of and additions to the workhouse hospital. The expense is estimated at £1,000.

Building Intelligence.

EARLESTOWN, LANCASHIRE.—The new church of St. John the Baptist was consecrated on the 6th inst. by the Right Rev. Bishop Kelly, D.D., late of Newfoundland. The style adopted by the architect is "Transitional Early English." The church consists of chancel, terminating with a semi-octagonal apse, 38ft. x 25ft.; transept on each side of chancel, 21ft. x 16ft. 6in.; nave, 51ft. x 29ft.; and the two aisles, 51ft. x 12ft. each; the vestry, 15ft. x 12ft., is at the north-east angle of north aisle, the vault for heating apparatus being under the vestry. Only a portion of the church is at present built, and the temporary west wall of common red brickwork gives to that end of the building a very unsightly appearance. The church, as now finished, will seat 600 persons, but if the original designs are at some future time fully carried out, there will be accommodation for 1,000; 44ft. in length is left to be added to the nave and aisles. A tower is shown at north-west angle of north aisle, surmounted by four pinnacles with carved crockets. The stone dressings throughout are of Runcorn red sandstone; the walls externally are faced with Yorkshire parpoints, and internally with rubbed face white Stourton stone. The nave has a king-post roof, with moulded tie-beams and purlins; pendant-posts, with curved, sunk, and moulded spandrels, give an additional support to ends of the tie-beams; these posts rest on carved stone capitals, surmounting circular stone shafts, the whole supported by carved red stone corbels. The other roofs are constructed with framed and braced rafters, the whole being in red deal left from the plane, without stain or varnish. The chancel has a boarded ceiling, divided into panels by moulded ribs; the other roofs are plastered between the rafters. A carved block (stone) cornice supports the moulded wall-plate of chancel roof. The chancel stalls are of oak, with carved poppy-heads to stall-ends; the adults' and children's seats are of pitch-pine varnished. Gibbs's (Perkins' patent) high-pressure apparatus is used for the heating. The carving was executed by Mr. W. Stevens, of Liverpool. The church is glazed throughout with lead-lights and cathedral glass of different tints, with white and ruby margins. The building was completed in April last year, with the exception of part of the seating. The contractor for the church did not supply the seats. The church has been erected from designs furnished by Mr. C. T. Whitley, A.R.I.B.A., of Stretton; Mr. Joseph Pennington, of Earlestown, being the builder, and Mr. J. W. Randle the clerk of the works.

GREAT GRIMSBY.—A Fisher Lads' Institute is about to be built here on land given by Colonel Tomline. It will provide a much-needed want for the numerous boys engaged in the fishing trade, who now have no place to resort to when on shore. The new premises will provide a large swimming-bath, lecture-hall, coffee-room, library, and recreation-rooms, with agent's residence, &c., &c. Mr. Charles Bell, of London and Grimsby, is the architect, and the works are to be begun at once. The estimated outlay is £3,000.

METROPOLITAN BOARD OF WORKS.—On Friday the tender of Mr. C. Killingbeck, amounting to £4,850, for constructing new sewers in Priory-road and Kilburn-vale, Kilburn, was accepted. The following applications by local authorities were granted:—Loans: Kensington Vestry, £4,425 for sewer works, and £1,175 for erection of cart-sheds and stables; Poplar District Board, £25,500 for paving works; Mile-end Vestry, £2,000 towards an improvement in Oxford and Jamaica-streets; and overseers of Putney, £3,500 for purchasing and fitting up premises as parochial offices. Permissions to borrow: Kensington Vestry, £3,078, expense of rebuilding bridges, carrying Ladbroke-grove and Golborne-roads over the Great Western Railway; Plumstead District Board, £500 for paving works at Eltham; and Shoreditch Vestry, £12,000 for paving and improvement works. The board's seal was affixed to a schedule of land proposed to be taken compulsorily under the Whitecross-street scheme of the Artisans' Dwellings Acts of 1875 and 1877,

and an application was directed to be made to the Home Secretary to appoint an arbitrator as stipulated by the Acts. Petitions for provisional orders were sealed as to three other schemes under the same Acts in Great Peter-street, Westminster, Little Coram-street, St. Giles's and St. Pancras, and Well-street, Poplar.

STAMFORD.—The opening of the new infectious wards added to the Stamford and Rutland Infirmary took place on the 15th inst. The new wards are situated east of the older buildings, a space of from 40 to 50 yards intervening between them. Three blocks of two stories each afford on each floor accommodation for five patients and a nurse. The buildings are of the local stone of the district, oolitic of varying density. The quoins, jambs, and window-heads are of Casterton stone, the window-sills and plinths of Clipsham limestone. The walls are lined with glazed bricks throughout, built in as the work proceeded, and jointed in Parian cement. The whole arrangements have been carefully worked out by the architect, Mr. Browning, of Stamford.

Hobart Pasha has received instructions to establish docks and landing stages at Constantinople. The work will probably be carried out by a Newcastle firm.

The authorities of the National Gallery have at last placed a portion of the Turner bequest in a position in which it is likely to be of some use to the public.

Bowry's Almshouses, Bow-road, E., were last week sold by auction for demolition, the site having been sold by the trustees, with the sanction of the Charity Commissioners, to the churchwardens and overseers of the parish of Bromley St. Leonard, upon which to erect a vestry-hall. The new building will be from designs of Messrs. A. and C. Harston, which have been approved by the Local Government Board.

It will be seen, on reference to our advertisement columns, that the directors of the Industrial Dwellings Company require the services of an architect and surveyor, at a salary of £500 per annum. The duties of the appointment include the responsible supervision of the company's building operations. Mr. William Ward Lee, who has been honourably associated with the company since its formation in the year 1863, will become the consulting architect.

In reply to their advertisement, the Southport Highway Committee had 70 candidates for the situation of inspector of paving, &c. After going carefully over each letter and reference, Mr. Thomas Hewitt, paving inspector of Bolton, has been appointed. He was selected from seven, who were sent for to give personal explanation.

The preliminary drift way of the tunnel at West Noathly, on the line from East Grinstead to Lewes, was completed last week after seven months' continuous work. Mr. Fairbank is the contractor for the railway, which is making considerable progress.

It is proposed to erect a terrace of buildings at Trinity College, Dublin, in replacement of an old row of houses from the end of the library to the corner of Botany Bay-square. Mr. Deane, of Dublin, is the architect.

The Baptist chapel in North-street, Halstead, was reopened on Tuesday week, after renovation, from the designs of Mr. Charles Portwee, of Chelmsford. The cost has been £340. Mr. King is the builder.

The Local Board of Grauga, near Ulverston, have had plans prepared for the sewerage of the district by their surveyor. The estimated outlay upon the scheme is £3,000.

The Government of Uri propose to pull down the ancient chapel on Lake Lucerne, known as that of William Tell, and have, it is said, refused permission to the Lucerne Artistic Society to detach the paintings on the walls, that they may be placed in the museum at Lucerne.

Mr. D. J. Humphries, late borough surveyor of Cheltenham, who carried out the present plan of sewerage irrigation for that town, died on Tuesday week in his 64th year.

A Local Government Board inquiry was held at Beccles on Wednesday week, before Col. Pensonby Cox, R.E., with reference to an application from the Town Council for sanction to borrow a further sum of £2,000 (making a total of £3,000) borrowed for works of sewerage. There was no opposition to the application.

The States of Jersey on Friday last invited Mr. Philip le Sneur, the States' architect, to send in his resignation on the ground of failing health. It was referred to a committee to consider the amount of annuity to be offered in consideration of Mr. le Sneur's long services.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
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RECEIVED.—P. G. S.—R. C.—T. B. I. Co.—F. J. B.—S. and Co.—F. L.—W. D.—T. Y. K.—J. S.—T. R.—G. and B.—W. S. C.—C. P. and G.—G. M.—G. R. B.

A. B. O. (The fact of the board having inadvertently affixed their seal to the plans with the dimension in figures fixing the frontage line cannot be held to make the plans unalterable in the face of any rule or precedent defining the line of building. The plans were signed probably in ignorance, and if the houses are begun the costs certainly should fall upon the board.)—H. H. H. (There is no dictionary of terms in French and English that we know of appertaining to architecture.)—"PERSPECTIVE." (The perspective points can be obtained only by the means laid down in treatises on perspective, and we can recommend Burchett's "Perspective.") The central line is an instrument lately introduced for facilitating the drawing of vanishing lines, and numerous explanations of its use have appeared in the *BUILDING NEWS*. The best rule to remember as regards vanishing points and lines is that all planes of the original object or building have their vanishing lines and points, and each of these lines is supposed to be made on the picture by a plane passing through observer's eye parallel to its original, till it meets the picture.)—TRY. (Need any honest person ask such a question?)—W. G. GASS. (W. M. Shirreff, 13, Palmerston-buildings, London, E.C.)

OUR COMMONPLACE COLUMN.

RECEIVED.—C. W. (The initials were a misprint.)—J. A.—C. F. W.—G. H. G.—E. W. P.

Correspondence.

ST. ALBAN'S CATHEDRAL.

To the Editor of the *BUILDING NEWS*.

SIR,—When I read my paper on St. Alban's before the Society of Antiquaries, on November 28th last, I exhibited a rough drawing to show my views, both as to the pitch of the original roof of the nave, and also as to its design. Messrs. G. G. Scott and J. O. Scott, the architects of St. Alban's, forthwith made a drawing, in order to show how inaccurate I had been. Mr. J. O. Scott at the same time prepared a report in answer to me, which was read at a meeting of the St. Alban's Architectural Society, on the 17th December, with a prefatory remark from the rector, as chairman, that it had "had considerable influence over the decision of the Faculty Committee in the course they had adopted with regard to the roof of the nave." It contradicted very positively the arguments which I had adduced, and was based on what was asserted to be an accurate measurement as contrasted with my hasty conclusions and incorrect drawing. In that report I find the following statement, made by Mr. J. O.

Scott, to which I wish now to call particular attention. He says:—"Doubtless, if Mr. Street is right in his conclusions, the only reasonable course open to the committee would be to abandon the proposed high-pitched roof." The alternative being "a bold act of destructive restoration," in which "I, for one, could never consent to take part." My conclusion was that there had never been a steep-pitched roof, with parapets on the nave of St. Alban's, and that Mr. Scott's scheme would give us something the like of which had never before existed there.

As long as Mr. Scott's impeachment of my accuracy could not be answered, I felt it to be impossible to hint at any possibility of inaccuracy on his part. But the careful drawing which Mr. Neale has made and published of the west wall of the tower is drawn in so minute a fashion that it is well-nigh impossible that it can be seriously incorrect in any single particular, and as it proves that my drawing was a singularly exact one, being nowhere more than about three inches out of the real line, there can be but one conclusion, I should suppose, as to the necessary results. Mr. Scott's own drawing of the roof lines has none of the evidences of careful examination and detail of the old roof line which Mr. Neale's shows, and indeed it absolutely ignores—as if they did not exist—the most important marks that remain.

If there is still any disposition on Mr. Scott's part to contest my own and Mr. Neale's accuracy, I would suggest that the best plan would be to exhibit for a short time at the Society of Antiquaries Mr. Neale's drawing, Messrs. Scott's drawing, and a large photograph, made for the purpose, of the wall itself. The facts will then be clear and indisputable, and Mr. J. O. Scott has already announced what his conclusion will be if they prove me to be right!—I am, &c., GEORGE EDMUND STREET.

14, Cavendish-place, W., Jan. 22, 1879.

ROOF OF ST. ALBAN'S ABBEY.

SIR,—Since my last rather lengthy communication was written, Mr. J. O. Scott's section has appeared in the *BUILDING NEWS*, and Mr. Neale's elsewhere. Until the latter came out we were still practically in the dark as to the lines which Mr. Scott had really laid down, whether of the supposed old roofs or of the proposed new one. And although he has shown Mr. Scott to be wrong in his conclusions, it is some satisfaction to find, after all that has passed, that Mr. Scott's lines were not impracticable and unreasonable, as from his section and previous explanations they appeared to be. That section was manifestly an impossible one, and must have been, from some cause or other, quite incorrectly given (see p. 23, *BUILDING NEWS*)—the top of the original Norman wall, as indicated at D, being shown 18in. below the bottom of corbel-table, whilst the supposed line of the original Norman roof would intersect the face-line of wall at 18in. or 2ft. above it; and, on the contrary, the supposed lowered roof would correspond very nearly with the line at D. Mr. Neale, however, shows that Mr. Scott's line really started from the top of the corbel-table, where Mr. Street and myself had placed it in our sections exhibited at the Society of Antiquaries, only that Mr. Scott placed the apex of his later lowered roof at the point indicated by H (see *Builder*, p. 69), which has correctly been fixed on by us as the apex of the original roof, and which Mr. Neale finds conclusively to be so. Whether Mr. Scott's radically new line he carried or not, he will at any rate not regret now that the investigation, made primarily at the instigation of the Society of Antiquaries, has resulted in Mr. Neale's masterly production, which has placed on record the architectural evidences of the case in such a clear and simple manner.—I am, &c., WILLIAM WHITE, F.S.A.

CENTRAL AREA CHURCHES.

SIR,—I read with great interest Mr. James Cubitt's article in your issue of 13th December last. Anything the designer of Union Chapel, Islington, has to say on the subject must always be instructive, as he has had the advantage of carrying out his ideas thereon in practice. As, in referring to the sketch-design I made for Truro Cathedral, he credits me with "taking a hint from Sienna," let me remark in

passing, I am rather ashamed to confess I did not know, till reading his letter, that the Italian cathedral had a central hexagon; however, on looking it up, I find it is so. The model I had in my mind was nearer home—the octagon at Ely. Principally for the reasons Mr. Cubitt states I adopted the hexagon instead of the octagon form in plan, though externally—as he remarks—it is not so easily treated. Had the site at Truro permitted longer transepts—say even to the extent of one bay only—the result would, I think, have been much more satisfactory for the general grouping. The nave might also with advantage be made wider than it is in the sketch, but I'm afraid the triple-roofed arrangement, suggested by Mr. Cubitt, would hardly compensate for the sacrifice it would involve—as at Bristol—of one of our most beautiful features, the clerestory, and I even doubt if a three-gabled narthex, such as at Peterborough, though magnificent in itself, would, without massive towers or spires, be able to hold its own against the bulk of the central lantern.

Doubtless both cathedrals and churches designed on the central area principle are more suitable to the greater congregational requirements of the present day than the long-drawn nave and aisles of the middle ages. I was glad, therefore, to see Mr. Carpenter had adopted it in his design for Manchester, and only hope he may soon have an opportunity of carrying out such a magnificent scheme, though perhaps Mr. Cubitt is right in saying the double-aisled nave is hardly the most suitable for the Anglican service.

It has often struck me as surprising that the octagon of Ely once designed, it did not lead the way to a further development of a central feature capable of so much beauty. Alan of Walsingham stands alone in this respect among all our English designers, none having had either the courage or the skill to follow up the example he left them, and yet he was apparently on the road to a Gothic dome—a feature we do not possess either in the ancient or modern English work of the style. It has often been quoted, as a reproach against Gothic, that what Wren and others have done in this way in Classic, has never been equalled or even approached in that style. Perhaps at the present time when, as a recent writer says, "The mediæval feeling is rarely the moving power of vigorous and thoughtful design," it may be too much to expect to see it accomplished. Still, as a covering for the central area of a church, no grander feature has yet been devised.

The tendency of our architects has rather been to solve the problem by increasing the width of the nave, as in some of Mr. Street's churches, and more recently in the striking churches, by Mr. Pearson, at Kilburn and Red Lion-square, where the side aisles are reduced to the dimensions of passages. No one can deny the success of these works, which present many features of planning worthy of attention. Only this is working out the subject on the old lines, it would be interesting to see what artists of such power would make of a large central area, where the old traditional forms could not be had—a site, for example, like St. Stephen's, Walbrook, where Wren has given us one of his most beautiful interiors.

Though perhaps irrelevant to the subject, Mr. Cubitt also discusses the question—argued some time ago in your columns—of the harmony of Gothic architecture with high class painting and sculpture, and says we must choose between "high art decoration and tracery decoration"—that is, Late Gothic and high art "do not go together." It seems to me it all depends on the excellence of the Gothic. High art will never agree with poor architecture, as in like manner it will never be out of place with really good artistic work, whether it be Late or Early Gothic—just as it is with Classic. As Stevens used to say, there is but "one art," and so long as the painting, the sculpture, and the architecture be really high class, designed and executed by artists to suit the purpose for which they are to be combined, there need be no fear about the result. But the designers must be artists—that is the first condition of harmony; if they are not and the work is, in consequence, poor, then they may call it anything they like—Gothic or Classic, Late or Early, it will not be art.—I am, &c., J. M. BRYDON.

SURVEYORS' FEES — QUALIFIED SURVEYORS v. QUACK MEASURERS AND ARCHITECTS.

SIR,—I quite agree with the strictures passed by an "Old Builder," and shall feel obliged by your inserting the following for the purpose of ventilating this subject.

Some few years since an old client instructed me to send him estimate and specification for repairing and redecorating his house. In due course this was done—the amount of my estimate being £612. After an interval of a few days client sent for me, and said he was quite satisfied with estimate, and a date was named for commencing the work. Some few days after he again sent for me, and said he intended to employ an architect, and asked me had I any objection to work under one, at the same time showing me architect's card, by which I found he was able to add F.R.I.B.A. after his name and profession. As a matter of course I expressed my willingness to place myself under his control. Consequently, in due course, the works were commenced, during which time client and architect ordered several extra works to be done. It therefore occurred to me one day at a meeting of client, architect, and self on the works, to call their attention to these extra works which were now accumulating very fast, and suggest to them to allow me to send in a statement of extra work up to date, and estimates for the other extra work then just ordered, for the purpose of avoiding any dispute as to cost at close of works. My client's reply was—"Mr. D., you have worked for me many years, and I have full confidence in your charges, and when the works are completed myself, my architect, and yourself will go over the account together, and settle the same amicably ourselves." Consequently, feeling secure on this promise, I proceeded with and in due course completed the works to the full satisfaction of client and architect, after which came the tug of war. I made out my account, and sent it to architect, the total of contract and extra amounting to about £1,117. After much delay the architect writes me that, having been over my account, he could not make anything of it, and he had recommended his client to have the work measured and valued, and that he had appointed a certain day for his surveyors to meet me or my representative on the works for the purpose of measuring up. Consequently, on the day named, my foreman attended and met the two men, and they were engaged about a fortnight over the work. After this another month elapsed, and, after several requests for a certificate, one day I received a lithographed price bill of quantities of about 70 pages, with note inclosed, informing me that Mr. Architect's surveyor had carefully measured and valued the work, the result of which was they had valued the whole of works done (contract and extra) at about £670, and, if I was satisfied with same, Mr. Architect was prepared to grant me a certificate for that amount.

I examined the bill of quantities for an elucidation of the great difference in amount, and was not long before I discovered that measurements and prices were most shamefully wrong—even on the first page alone there were many pounds short in prices and quantities.

I called upon the architect, and showed him several of the most glaring errors, which he pretended not to see, and finally closed the interview by informing me that he had every confidence in his surveyors, and would not allow me to question their veracity. I thereupon left him the quantities, and came away. Some few days or weeks after he again returned me the quantities, and said his surveyor had corrected a few errors, and I could have a certificate for about £700 in full settlement of my account. Of course I could not accept so ridiculous a sum, and wrote him to that effect. Several weeks more elapsed, and I could not get any further settlement from the architect. I then wrote the client, informing him of the injustice under which I was suffering, and reminded him of his former promise for the meeting to take place and settle the matter. Client wrote me, saying that he had been advised by his architect my account was not correct, and that he had left the matter entirely in the hands of the architect. After further delay I again wrote the client asking

him to reconsider his determination, when I received a note from architect to meet him and the client at latter's house, which I attended, and pointed out again several mistakes and omissions in the quantities, which the architect would not admit and the client would not see. So the meeting broke up on the understanding that architect would write me respecting the result of our conference.

After a few days the architect writes me to say he is willing to give me a certificate for £800 in full settlement of my claim. This I promptly yet respectfully refused, and after another delay he again wrote, offering £900, which I again refused. After further correspondence, the architect again writes me, saying he would, as an ultimatum, give certificate for £1,000. This I promptly refused, and not being able to obtain any further advance from the architect, and feeling entirely disheartened and disgusted with the treatment I had received, I resolved upon placing the matter in the hands of my solicitors, and instructed them to proceed with an action for the recovery of the full amount of my claim. To my surprise, the morning following that on which my solicitors had given notice of action, client called upon me at my office, entreating me to stop the action, and to meet him at his residence next morning to settle accounts, where I attended in due course, when he told me how shamefully he had been treated by being charged £50 for that precious bill of quantities, and about £200 for architect's services. I reminded him it was all his own fault in not keeping to his original promise. In reply, he asked me to pay the £50 for quantities, which I refused. Yet, after further begging hard for some reduction, I considered he had fallen into evil hands, and so consented to take off the odd £17, and thus made a settlement at £1,100, after which I informed client that I must respectfully decline to have any further transactions with him. I assure you I have been extremely careful since not to place my reputation or property too readily in the hands of any architect or surveyor who may wish to ruin me.—I am, &c.,

J. W. DUFFIELD.

Queen's-gate Works, Kensington Gore, S.W.

QUACK SURVEYORS.

SIR,—Your correspondent "Provincial," in assuming that my remarks in your issue of the 10th inst. did not apply to "surveyors," is correct. The scandals alluded to are usually the work of men engaged by their clients as "architects"—the client, in nearly all cases, being under the impression that the usual 5 per cent. commission is the total remuneration his architect receives for his services of every kind; whereas I can show that the architect frequently extracts from his client from 10 to 12 per cent. additional for "quantities," "copies," and "measuring."

I can assure your engineering correspondent of 7, Westminster-chambers, clients are so green as not to know of the existence of the charge for quantities, and it is only a few weeks ago I read a letter signed by a Westminster firm of engineers—members of the same society as your correspondent—in answer to inquiries from a public board, to the effect "that although they would charge a commission for quantities, it would make no difference to the board, inasmuch as the contractor paid them for that work." In that case ten out of twelve members of the board were "green," the other two, being old hands at the business, exercised their fair influence, the result being the appointment of an independent surveyor.

In my experience, which is large, I maintain that the work of a bona-fide surveyor is well worth the fees or commission such men charge, and that they never resort to fraudulent tricks to swell their bill. Their work is so well done that it is open to the light of day; they furnish every detail of their dimensions when required, and are always ready to defend the accuracy of their work, or accept the responsibility if inaccurate. While, on the other side, the "quack" who is usually the architect as well as surveyor, frequently charges a higher commission, and not unfrequently manages to issue two or three sets of quantities for the same job, charging commission each time, although the

repetition is the result of his own ignorance rather than the fault of the client, who has to pay. The quackery of these men could easily be discovered by a sight of their dimension books, but they take care not to expose them to any eye but their own, and the builder is in the same happy state of ignorance as the client until the work approaches completion. If an ignorant man he finds his place in the Bankruptcy Court; or, if he knows his business, he finds the necessity for submitting a large bill of "extras," which oftener means "deficient quantities," and I candidly admit in some cases he discovers the quantities to be largely in excess for his benefit.

Perhaps the most important point in this discussion has not yet been mooted by any of your correspondents. It is this:

In many, if not most, cases in which the architect issues a bill of quantities, such work is not even done by himself, but by casually engaged clerks in receipt of about 40s. to 60s. per week. These men are usually inefficient joiners, masons, or bricksetters, who, not being able to keep in constant employment at their own trade, having the advantage of fairly good address, obtain occasional employment as clerks of works or office clerks. They thus pick up a smattering knowledge of measuring, and in their ignorance, and in want of a situation, they represent themselves as quantity surveyors; their employer, the architect, pays probably a fortnight's wages, say £5, and after endorsing the bill with his signature charges one, three, or five hundred pounds as he sees fit. His client pays it, without knowing, and has no voice in the matter. Needy assistants of this kind are not always proof against the bribe of the "lowest" but most intimate of his building friends frequenting the office, it being well known that Brown or Jones takes out all the quantities in So-and-so's office. Poor fellow, he only gets two guineas a week; who can wonder at his accepting the generous offer of £50 from his friend Black, the builder? All he is expected to do for it is to add on to the quantities a few rods of brickwork and other things in proportion.

I feel unable to fathom the case named by your "Constant Reader," who does not appear to know that it is almost impossible for a builder to obtain a contract in which he is allowed to make his own account—he is usually bound to accept the architect's certificate of a final account; and that it seldom occurs that the contractor has any voice in the appointment of the surveyor. AN OLD BUILDER.

ARCHITECTS AND SURVEYORS.

SIR,—Amongst the mass of correspondence which has taken place from time to time on the relation between architects and surveyors I have not seen it clearly stated what are the position and duties of the quantity surveyor. Most of the writers appear to treat him simply as a man who performs a portion of the work of the architect. A practice of nearly 20 years, and an intimate professional acquaintance with some of the most eminent of the London surveyors, have convinced me that the two professions are quite distinct, and that one cannot be legitimately practised on the same occasion as the other. A surveyor is properly a builder's man, and not an architect's. It is his duty to take out the quantities of the several descriptions of work from the drawings in the manner that builders require for inserting their prices, and to arrange them in such a way that important items, depending on the difficulties of the work or on the state of the market, may be placed prominently before the parties who are expected to tender, as they are seldom allowed sufficient time to go into the matter for themselves. In my experience this is what architects and amateur surveyors seldom attempt, and when they do they almost invariably give prominence to items which, although important, perhaps, as architectural features, are often of minor consideration as regards expense. Hence the honest builder has no love for quantities prepared by inexperienced persons. Dishonest ones, however, often find in these imperfect quantities an engine of immense power in controlling the architect and placing him under his thumb. If the quantities be in excess the fact is never mentioned, and in a

large job it is only the builder, who has to order his materials, that will find it out: the architect has no means of doing so without an amount of labour that few would be willing to undertake on the chance of discovering an error.

Again, the surveyor is not inaptly termed "a builder's attorney," and a bill of quantities may be compared to a deed of settlement or conveyance, in which every sentence must be framed to admit of only one meaning—viz., that which conveys the intentions of the parties; but with bills of quantities the difficulty of expression is greater, owing to the variety of description to be found in builders' work, and courts of law will not permit of extraneous evidence to clear up obscure meanings in a contract.

In contentious cases arising out of builders' contracts it is the surveyor who must prepare the case for counsel and work up the evidence, as few solicitors are sufficiently acquainted with the technicalities of building to do it themselves.

The duties of a surveyor require a long and special training of a kind that is incompatible with that necessary to make an architect. Errors in quantities for large works can only be avoided where the parties engaged have been trained to the duties from their early boyhood. Those who take up the profession later in life have not the routine of the duties sufficiently impressed on their minds; consequently, in large jobs, they get bewildered before they are half through the work, and errors creep in which somehow or other, on whatever side they be, come out of the employer's pocket.

A noticeable point in most of the correspondence which has lately taken place on the matter of quantities is the percentage charged by the quack surveyors. Why, sir, it is almost double that which the most eminent surveyors in London charge for their work. It appears to me that the system in vogue 20 years ago was the best of all, and the most satisfactory to the employer. The architect prepared his drawings and specification, and the builder was bound to carry out the work for the amount of his tender, regardless of what was taken in the quantities by the surveyor, whom the builder had himself appointed. By an estimate of a simple description, which every architect should be competent to prepare, he would be enabled to advise his employer on the reasonableness of the tender submitted by the builder. This dabbling in bills of quantities by architects has been the cause of more claims for extras and other annoyances to employers than anything I know of.—I am, &c., J. S.

ARCHITECT OR SURVEYOR.

SIR,—Under the above heading instances of collusion between the builder and the surveyor have been pointed out by "Old Builder" and "Constant Reader." I would point out how this is conducted by the possibly increasing practice of the architect entrusting the taking out of quantities, and especially the measuring up of the works at their completion, to an independent surveyor.

The client employs the architect, and he relies upon the architect for his assurance that the final measurements are correct, and that the final bill is right.

So long as the architect supervises these he can confidently assure his client of their accuracy, but immediately that he deposes these works to an independent surveyor all control passes from the architect, and any "collusion" between the contractor and the surveyor is altogether unknown to the architect, who indeed is precluded from questioning the surveyor's bill when it is presented.

How indeed an architect can certify the correctness of an account, in the preparation of which he has had no part, and over which he has had no supervision, I fail to see.—I am, &c.,

ARCHITECT.

CONTRACT SCHEDULE OF PRICES.

SIR,—The schedule of prices upon which estimates are based are equally applicable to additions or "extras" to and "omissions" from contracts, I have always understood. Will some of your obliging correspondents have the goodness to inform me if there are any special cases, and what they are, when an exception to the rule is justifiable, and regular in its adoption? As in an extensive contract for a public work,

with which I am familiar, a large quantity of lias concrete was provided for in the bills of quantities—viz., 4,317 yards cube, at 6s. per yard (at which price the item was duly credited the clients as "omissions")—but in the "extra" works bill, as per measurement, 16,441 yards cube was charged at 8s. per yard. The difference in the price, as will be seen, puts £1,644 into the contractor's treasury. The quantity surveyor measured, and made out the amount, the contractors approved of his liberal views, and the architect certified the same, and so the transaction was completed! I make no further comment on it, than that it appeared to me to be an extraordinary thing that in the "omissions" or credits the schedule should be recognised and adhered to, whilst in the debits or "extra" works, its existence should be ignored! What service can a schedule be, if it does not govern and control the rates at which both "extras" and "omissions" are valued?

I should feel very grateful to any one who can show some valid grounds upon which the divergence from such schedule is allowable and permitted.—I am, &c., CONSTANT READER.

CLERICAL DRESS IN 1750.

SIR,—The figure described by Mr. Harry Hems as that of a clergyman in 1750 I should imagine would be more accurately described by him as that of some schoolboy like those of St. Margaret's and the Grey Coat Hospitals—familiar to us in Westminster, or the "Blues" of the City, or one maintained by the alms of the good folk of Pinhoe, as his place over the offering-box suggests. Savage, in 1735, thus describes the dress of the period in the "Progress of a Divine":—

Let testimonials then his worth disclose,
He gains a cassock, beaver, and a rose.—I, 19.

On obtaining a curacy he adds, without authority:—

A swelling, rustling, glossy searf. [of a D.D.]

(See for the long buttoned cassock my annotated "Canons of 1604") (J. Parker, 1874.) In 1753, Archdeacon Sharp, in his visitation charge, mentions as the dress "worn on every occasion abroad, and even upon journeys such badges as the band, hat-band, or short cassock," which falls in with one of the directions in the canons, "uti ne in publicum nisi promissis vestibus induti prodeant," which "promissæ vestes" are interpreted in a marginal note by cassocks, and in the English version of the canon by a paraphrase which implies a liberty of wearing them short, "in their doublet or hose without coats or cassocks." (My edition, p. 150.) Addison, in the *Spectator*, 1714, No. 609, mentions a clergyman "equipped with a gown and cassock for his public appearance." Fielding's Parson Adams, in 1742, is repeatedly introduced as wearing the cassock. The clergy, about the year 1820, had as a body entirely neglected the use of the short cassock in public, and the great majority even the clerical hat and rose, which are now worn by bishops, deans, and archdeacons. The short cassock differs from the long kind in having no collar or sleeves, as it was worn under the coat, and extended only about 2in. below the knees. In the beginning of this century there were cassocks for riding, and others for walking. They had a broad band or sash round the waist. The beaver was triangular in shape, often known as a "wind-cutter" to "Old Westminsters" when adorning a head-master in the present century. It has been changed into a round form with a low crown and a broad brim tied up behind. The present broad ribbon has superseded the hatband—a roll of black silk stuffed with wool—which was used to puff out the interstices or folds of the triangular hat. To it Dryden alludes. The pair of bands are so designated by Bishop Taylor; and Addison, Ben Jonson, Swift, Pope, and Crabbe call it the band. It is the "collare" of the Oxford Statutes, and superseded the Jacobean ruff. In a satirical print of 1814, which lies before me now, the "master parson" is dressed in the short cassock and sash, a full-sleeved gown and scarf, a beaver, and rose wig, and bands; the "journeyman" has a beaver and ribbon (bands), gown, and scarf, a buttoned doublet, and knee-breeches, with shoes tied with strings. Those of his companion have buckles and watertight tongue.—I am, &c.,

MACKENZIE E. C. WALCOTT.

PENMAENMAWR OR BLUE WELSH STONE

SIR,—Referring to Mr. Allison's (borough surveyor of Bradford) letter to you headed "Penmaenmawr or Blue Welsh Stone," appearing in your issue of the 17th inst., we beg to correct any wrong impression that this title may convey as to the name "Penmaenmawr," when applied to setts, being now synonymous with "blue Welsh stone."

The first quarries opened here were no doubt in the blue stone, and very large quantities of this material must have been sent away, as is proved by their great extent, but our quarries, though at Penmaenmawr, are not in the blue stone at all. The colour of our granite is grey, the grain is coarse, and calculated to combine in a remarkable degree durability with an excellent and lasting working surface so necessary for a heavy and busy traffic.

We believe our granite is especially adapted for meeting the requirements of the general traffic of a large town or city, or the concentrated traffic between the rails of a tramway, so that we feel sure Mr. Allison will be ready to do us the justice of admitting that when he referred to "Penmaenmawr or blue Welsh stone" he did not apply his remarks to our grey granite.—We are, &c.,

DARBISHIRES AND CO.

Penmaenmawr, January 22nd, 1879.

THE BELLS OF ST. MICHAEL'S.

SIR,—I have just received my copy of this week's BUILDING NEWS. I am sure that many of your readers besides myself would like to know how the bells of the Church of St. Michael and All Angels, Bedford-park Estate, are to be rung, and where the ringers are to stand. From the drawings I make out that there are five bells (*en passant* I would mention the great weight of five bells carried on a roof), four in the bottom story and one in the top. Now, to ring a bell properly the clear space in front, behind, and above it must at least be equal to its own height—that is, the bell must be able to turn completely round its own axis. It seems to me impossible for these bells to do this. Perhaps Mr. Shaw will explain to us how he intends the bells to be used. I hope he does not intend them to be simply used with a carillon machine. Those carillon machines are almost stamping out the noble art of campanology.—I am, &c., JUNIOR.

THE NEW LAW COURTS.

SIR,—In your impression of Friday, January 17th, you give a description of the work at the east block of the New Law Courts, in which you state the clock-case to be by Mr. Benson. This is no error, as it was made and fixed by us to the design and order of G. E. Street, Esq., R.A., and so far as we know Mr. Benson has nothing to do with it. There is also an error as to the door furniture, which you say is by Mr. Lever. We are the makers of it.—We are, &c., THOMAS POTTER AND SONS.

South Molton-street, London, W., Jan. 18.

At a general assembly of the Royal Academy of Arts, held on Wednesday evening, Mr. Valentine C. Prinsep, Mr. S. Luke Fildes, and Mr. J. M'Whirter, painters, were elected associates.

The London School Board, on Wednesday, rearranged the staff of the architect's department, placing on the permanent list five draughtsmen, a tracer, a junior writing clerk, and an office youth. The salaries of several of these officers were increased.

Plans for new offices for the Portsea Island Board of Guardians have been prepared for that authority by Mr. Houghton, their architect, and will be carried out subject to the sanction being obtained of the Local Government Board. The estimated cost is £3,650.

A bookkeeper and collector, named John Waring, has been committed for trial at Liverpool, charged with having embezzled about £2,000 belonging to his employer, Mr. Westmoreland, a builder, of that town.

A new Wesleyan chapel is about to be built at Rotherfield, near Tunbridge Wells, to accommodate 200 persons, at an estimated cost of £600.

Plans have been prepared by Mr. Anderson, architect, of Edinburgh, for the rebuilding of Mount Stuart House on the Firth of Clyde for the Marquis of Bute, on the former site, leaving the wings as they were before the fire in December, 1877. The new design contemplates a large addition to the main building, which will comprise a magnificent central hall, with suites of rooms on either side. Lord Bute has approved the plans, and tenders are about to be invited for the work.

The parish church of Heallan, near Denbigh, has been restored, and will be reopened on Tuesday next. Last week one of the glaziers at work on the building, a man named Joseph Davies, of Chester, fell headlong through the window owing to the shifting of the ladder, and was killed. At the inquest it was deposed that the deceased had set his ladder on a board laid across the pews, the upper end forking a mullion.

The Brighton Town Council have appointed Mr. Benjamin Lomax, C.E., of that town, curator of the museum, free library and pictures gallery.

Intercommunication.

QUESTIONS.

[5645].—**Stability of Walls.**—Will any of your readers give me a practical rule for calculating the required strength and dimensions of retaining walls, both for sloping and horizontal earthwork, also walls holding back water in reservoirs?—C. E.

[5646].—**Condensation on Walls.**—Would some reader kindly advise me in the following case?—The walls of a bedroom are painted four coats oil colour, the result being that during hot weather moisture condenses on them and makes everything in the room damp. Is there any way of curing this condensation and consequent dampness except by taking off the paint and fresh papering? I may add that sizing and papering were advised, also ventilation by means of the window and door. These were tried, but with no better result.—C. C.

[5647].—**Glass.**—Would any reader state if the glass used for gas globes, commonly called white globes, can be got in flat sheets?—LIGHT.

[5648].—**Timber Houses at Lisieux.**—In passing through Normandy lately I noticed at Lisieux two very fine houses of timber in the Grand-rue (near the cathedral), but had not time to sketch them. As these old houses are fast disappearing would any of your correspondents who are fortunate enough to have drawn them publish in your journal for the general good? P.S.—These two houses stand together, and one overhangs very much.—J. G. ELGOOD.

[5649].—**Country Public-houses.**—1. Is there any work published which gives examples of some of the fine old country public-houses, half-timbered or otherwise, such as those always associated with coaching days? 2. Will some of your readers kindly name the whereabouts of some such public-house within, say, a 30-mile radius of Trent Junction, which would repay a visit to any one interested in this study?—J. W. W.

[5650].—**Preparing Wood Blocks.**—Can any correspondent kindly enlighten me as to the mode of preparing the surface of the wood block preparatory to drawing upon it for wood engraving? I learnt it once, but have forgotten it.—J. S.

[5651].—**The Use of Statuary Marble in Out-door Work.**—An Exeter architect has shown me a letter, wherein a London marble merchant, advocating the use of statuary marble for out-door purposes, gives the assurance that it will resist the atmospheric influences of Devonshire fully as well as it does those of other counties in England. Surely this is very ambiguous. It would be interesting to know in what counties statuary marble will stand when exposed to the ordinary changes of the weather. Silician and vein marbles withstand the changes of our trying climate well; but, so far as I recollect, I know no instance of pure statuary being used successfully.—HARRY HEMS.

[5652].—**Cast of Carvings.**—I wish to take impressions of some stone and wood carving, and to take plaster casts from the same. Can any of your numerous correspondents kindly inform me of the best method to do so?—J. W.

[5653].—**Castings Plaster of Paris with Gelatine Moulds.**—Would any of your kind readers inform me if there is any chemical used in hardening the surface of a gelatine mould, and, if so, what? I use the best Russian glue, and have rubbed several stuffs on the surface of it to harden it, but without success, this climate being so warm that after a few casts are taken from the mould it becomes quite flabby and soft, and loses its sharpness. Perhaps some of my fellow-plasterers in good old England will oblige me with the above information—also if there is a better kind of glue used; and I will only be too happy to supply any information about the Colonies.—AUSTRALIA.

[5654].—**Red Quarry Floor.**—I have recently laid down a 9in. red quarry floor, bedded in mortar, and grouted in Roman cement. The quarries, although good in colour, were rather uneven, and the bricklayer rubbed them level at the joints. They have now gone a bad colour in patches. Can any of your numerous readers kindly explain the cause of this, and say what can be done to remedy it and make them their proper colour?—A SUBSCRIBER.

[5655].—**Surveyors.**—I shall feel obliged if any of your readers who may have had experience in such matters will kindly give their opinion on the following subject:—In the case of two surveyors looking at one set of quantities, one of whom is appointed by the proprietor of the work, and the other elected by the builders to watch their interests, (a) is the surveyor for the proprietor not bound to do the work completely for his client, at the same time giving every facility to the builder's surveyor for checking him as he proceeds; (b) and is it not out of the power of the former to insist on the latter doing anything beyond exercising such a careful supervision as he may consider necessary for the protection of those whom he represents?—SURVEYOR.

[5656].—**Esthetics.**—Will any reader kindly give me a list of works on esthetics, ancient and modern, English and foreign?—C. F. W.

[5657].—**Slaughter-houses.**—Can any reader give me information regarding slaughter-houses, or recommend some good work on the subject?—J. J.

[5658].—**Lime.**—Could you or some of your experienced readers inform me what is the quantity of lime required for a cubic yard of rubble masonry; also for a superficial yard of stone pitching, 8in. deep and 1 of lime? I am charged with what appears to me an enormous quantity of lime for the work done. I am about to build a brick garden wall. What quantity of lime should a cubic yard take?—E. C. S.

[5659].—**Brick Kiln.**—I want to know the simplest way to convert a furnace kiln, with smoke flues through the crown, into one that will consume its own smoke, or at least very much reduce the nuisance?—W.

REPLIES.

[5631].—**Sketching.**—As supplement to the information given by "O. E. S." let me add that Lyng has a fine W. tower and benches of 15th-century work, but North Curry and Stoke St. Gregory are of greater interest. Both are cross churches with central octagonal towers. A small monument with inscription at Athelney has an historical interest only. The ruined church on a mound is not worth a visit. Othry has an octagonal tower. From Langport Curry Sivel and Isle Abbotts should be visited; the latter, one of the most interesting churches of the district, having a beautiful Early Geometric chancel and a Norman font, in addition to very perfect specimens of the Tudor tower, benches, &c., which are so common in the neighbourhood. In addition to those mentioned by "O. E. S." there are octagonal towers at Ichester, Piddimore Milton, Weston Bamfylde, Barton St. David's and Douling, and also at Bishop's Hull and Pitminster, near Taunton. They form a feature in Western Somerset, and are worth collective study. The chief feature, however, throughout the county is undoubtedly the towers and other 15th-century work, which is not of such value to the architectural student as the earlier and robust work of the larger buildings of Lincolnshire and Northamptonshire; nor do I think the churches present such studies of picturesque effect and arrangement as the smaller ones of Sussex.—A. F.

[5633].—**Concrete Columns.**—I should recommend Portland cement above any other material for filling in columns under water.—G. H. G.

[5639].—**Quarries.**—Can be procured from any glass works that still manufacture crown glass, or from a merchant (Dawbarn and Co., 3, Temple-street, Liverpool). The sizes vary considerably. Some tables can be cut up to about 2in. from the "bull's-eye," others not nearer than 4in., leaving quarries from about 5in. x 5in. up to 9in. x 9in. A tinted surface can be obtained on plaster by mixing a finely-ground colouring pigment in a dry state with Parian cement. This can be applied in the usual way as a thin finishing coat on a ground of Portland cement, which, after being well trowelled, presents a polished, non-absorbent, washable surface. In imitation marbles and scagliola the colours are inserted in a semi-fluid state on the surface before the facing is put on. In some cases silk thread is used as the medium, the threads being drawn through the facing cement, leaving the colours behind. A backing of canvas or cement may be put on of any thickness required. It is afterwards polished by friction.—C. W.

[5640].—**Jointing Drains.**—Some engineers object to clay jointing, but I have never heard any good reason for so doing. Like "B," I have always preferred clay as a luting. If clay puddle is good for lining trenches, surely it is good for jointing pipes, as being more yielding. Cement cracks if used alone, and pipes laid with cement pipes are never proof. The asphalt joint is no doubt the best.—G. H. G.

[5641].—**Flues.**—A 9in. square flue is now recognised as amply large enough for ordinary building, although in the Chimney Sweeps Act the old size is adhered to. The general practice of architects is to make square or circular flues. The remarks in the "Commonplace Column" are quite correct, and may be taken as authoritative.—G.

[5641].—**Flues.**—In reply to "B." the size of chimney flue generally adopted is 9in. x 14in. This is according to the Chimney Sweeps Act. This size saves cutting of the bricks, and is eminently adapted as a smoke-producer. The excessive amount of cold air which passes up a chimney of that area will prevent in an admirable manner the consumption of the unburnt carbon, which of course adheres to its sides, and requires the sweeper's constant attention. It is a most antislud size for promoting draughts, &c. Of course the size enables the sweep to use his sweeping appliances most effectually. If I remember right Mr. B. H. Thwaite (*vide* "Hygiene") proposes separate outlets for animal and gaseous products of combustion. If "B." will examine a 5in. diameter American stove-pipe he will find it prevents the formation of smoke, and that 24 square inches area is ample for carrying away products of combustion from an ordinary fire. And no doubt if fireplaces and flues were constructed on scientific principles the sweep's occupation would be gone, as the existence of such a craft is only another instance of an utter disregard for science.—O MORES.

[5641].—**Flues.**—With reference to remarks from "B." about flues, it is obvious that, as the smoke

naturally assumes a cylindrical form in ascending the flue, a circular section is best. This form, for constructive reasons, is chiefly confined to concrete buildings or when pipes are used. In brickwork a square flue is more suitable than one of a rectangular section, as the smoke is less likely to spread and get chilled lagging in the corners. The smaller section of the square flue produces a better draught, and is more easily swept. For ordinary house fires a flue 9in. square is ample, and, as a rule, this is the size adopted in practice. A larger section was necessary when the climbing method of sweeping was in vogue.—C. W.

[5642].—**Defective Drains.**—"A Subscriber" had better report the case he complains of to the local sanitary authority, and if they take no notice the Local Government Board ought to be written to, so that the landlord may be compelled to adopt some remedy. The best mode of preventing the rise of noxious gases would be to excavate a trench along the line of sewer in the basement, and to fill in the same with concrete. Stoneware or iron pipes are better than brick drains in such a position. Another suggestion I would make is that at the highest end of such basement drain, or at any other convenient point, a ventilating pipe should be carried up, either to enter a flue or quite independently on the outside of house. The outside traps should also be ventilated.—G. H. G.

LEGAL INTELLIGENCE.

METROPOLITAN BUILDING ACT, 1855.—District Surveyor for East Hackney (North) v. Sawin Bros. and Co.—Heard at Worship-street Police Court before Mr. Bushby, the 19th December, 1878, and 16th January, 1879.—An outbuilding (400.1) had been erected against the residence No. 102, Clapton-common (1,300.4), but it had no internal communication with the house. The district surveyor followed the decisions in the cases of *Badger v. Corbett* (*Builder*, 19th March, 1859), District Surveyor of St. Margaret v. Biss (November, 1871), and *M. B. W. v. Flight* (*Times*, 19th June, 1872), regarded the outbuilding as an addition to the dwelling and claimed £1 12s. 6d., a half fee upon the area and stories of the house and outbuilding together (1,400.4). The solicitor for the defendants contended that the outbuilding was a separate building, and the fee charged should have been 15s. per cent., as for a new building under 400 square feet in area and the story in height. The magistrate gave a written decision as follows:—"Two questions arise here. 1st. Does the separate entrance make this a distinct new building instead of an 'addition'? 2nd. If not, is the half fee to be reckoned on the single story, and the area of the addition on the stories and area of the original building plus the addition? As to the first question I think that the new building being subordinate to and for the commodity of the original building the separate entrance only makes the former an attached building as distinguished from what with a common entrance would be a mere extension of the original building. The note to the 2nd schedule provides expressly for an attached building by ordering that its area shall be added to that of the main building in estimating the fee for the whole. And this would be for the owner's benefit where instead of being as here a subsequent addition, the attached building was constructed together with the main building—e.g., where the area of the main building was 300 square feet, and that of the attached building 100 square feet, both would be covered by a single minimum fee of 30s. As to the 2nd question I adopt Mr. Arnold's reasoning in the case of the District Surveyor of St. Margaret's, Westminster, v. Biss—viz., that an 'addition' falls within the same rule as an 'alteration.' Now, if instead of an addition say a chimney had been altered, the half fee which is to be reckoned on stories and area could be reckoned only on the stories and area of the main building, including the chimney. That method, therefore, must be followed here, and the defendant is ordered accordingly to pay 32s. 6d. per cent., claimed, and 2s. costs.—Signed, H. J. BUSHBY."

INJURY FROM BUILDING OPERATIONS.—At the Common Pleas Division, Dublin, on January 16th, the action of Graham Lemon v. Meade and another was re-tried before Mr. Justice Harrison. It was to recover damages, laid at £900, for alleged negligence on the part of the defendants' servants, whereby the house, 47, South King-street, Dublin, was injured and fell. The case was tried at the Easter sittings, 1878, before Mr. Justice O'Brien, and after a hearing of six days resulted in a verdict for defendants, but the jury also awarded plaintiff one farthing damages. Defendants were, it seemed, engaged by Messrs. Gunn to build the Gaiety Theatre; operations were commenced in March, 1871, and the theatre was opened in November of the same year. Plaintiff's house, which immediately adjoined the theatre, fell on the 18th April, 1875, having, it was contended, been injured by the building operations. The defence was, that the house fell by reason of old age, having been erected nearly 200 years ago. The case now came before the court on defendants' motion, showing cause against making absolute a conditional order obtained by plaintiff to set aside the verdict on the ground that it was

against the weight of evidence and the reception of illegal evidence. The court allowed the cause shown, and discharged the conditional order, but gave no costs against plaintiff.

THE DRAINAGE OF COLCHESTER.—At Colchester county-court, on Wednesday week, actions were entered by Messrs. Marriage, of East Mill, and Mr. E. Chopping, of Middle Mill, against the Corporation of Colchester for breach of the Public Health Act and the Rivers' Pollution Prevention Act by continuing to allow the sewage of the town to run into the River Colne, by which the plaintiffs alleged that they not only suffered inconvenience, but that the health of themselves and their employes were prejudiced. The cases were exactly similar, and that in which Mr. Chopping was the plaintiff was taken as a representative one. In the opening address of counsel it was shown that correspondence had for the past ten years passed between the Local Government Board and the urban authority, the former body urging the necessity of some other system of sewage disposal than passing it into the river, and the latter promising to take steps, although nothing had been practically accomplished. It was also stated that it would be shown by medical evidence that an outbreak of typhoid fever which occurred at the east end of the town in 1874 was attributable to the discharge of sewage into the Colne, and the judge (Dr. Abdy) was asked to grant an order for the discontinuance of the nuisance. At this stage of the proceedings a conference took place between the town clerk and plaintiffs' counsel, which resulted in a compromise, of which the principal feature was that the Corporation undertake within two years to provide a proper system of drainage by which the outfall into the river will be avoided.

AN OFFENSIVE MANHOLE.—In the Chancery Division of the High Court of Chancery, on Thursday week, the case of *Swanston v. the Twickenham Local Board* was heard. This was a motion on behalf of plaintiff for an injunction to restrain the Local Board of Twickenham from continuing to use a manhole, which was constructed close to a house belonging to plaintiff, and through which manhole access was obtained to the common sewer. There was evidence to show that scarlet fever had existed in the district, and that one case in particular had probably been caused by the effluvia arising from the manhole in question. In support of the motion it was submitted that the only power given to defendants by the Act 38 and 39 Vict., cap. 35, was to work under and through any property, unless they gave the proper notices for purchasing the property, and that otherwise they had no power to open the ground for the purpose of constructing the sewer. The Vice-Chancellor said the question raised in this case could only be determined at the hearing; but, in the meantime, defendants could cover up the manhole in such a manner that no effluvia could arise from it, and further they must undertake not to proceed under their notice as to opening fresh holes without giving plaintiff a week's notice of their intention, in order that plaintiff should have time to take such proceedings in the matter as he should be advised.

A new hotel and restaurant are about to be erected at Fort Opus, Austria, for Mr. Grossi. The building will be 4 stories high, including basement, and will cover about 324 square yards of land. It will stand in an elevated position at the junction of two rivers. The materials used will be red brick, with local lime stone dressings to the doors and windows, and the roof will be covered with red tiles. The architect is Mr. G. H. Thomas, 32, Lord-street, Liverpool.

WATER SUPPLY AND SANITARY MATTERS.

GOOLE, YORKSHIRE.—Mr. E. C. Buchanan Tudor, the town surveyor, has been requested by the Goole Local Board to design sewerage works for old Goole district. The scheme is now completed, and comprises a brick main tank egg-shaped sewer with ventilating man and lamp-holes, penstocks, sluice chambers, stop valves, storm and flow, &c., and the outlet pipe is of cast iron with piled and concrete foundations. The sewerage is to be carried into a tidal estuary, known as the Dutch River, below low water mark.

HOVE.—A Local Government Board inquiry was held at Hove-next-Brighton, on Friday last, before Mr. Arnold Taylor, inspector, with reference to an application from the Town Commissioners of Hove for sanction to borrow the sum of £1,550 for works of sewerage, sea defence, and for providing an infectious diseases hospital. Considerable opposition was raised to the last-named item, and it appeared that the hospital plans were not yet prepared. The remaining items were unopposed, and included £1,500 for a new sewer in Hove-drive, £520 for improved sewer in George-street, and £450 for new groyne to protect the beach from the effects of the private groynes constructed westward of the district. Mr. E. B. Ellice-Clark, the engineer to the board explained the plans, and stated that the works would be carried out by the town commissioners' staff, and that the last works sanctioned by the higher authority were executed in this manner, and at a saving of something like £1,500 or £2,000 upon what they would have cost if done by contract.

A series of water mains are proposed to be laid through the main streets of Harlow and Epping and other villages on the high ridge running through the Forest of Epping for the better supply of the district, which has often suffered from shortness of water. Messrs. Russ and Mians, of Westminster, are the engineers of the scheme.

The Town Council of Nairn have instructed Mr. Willet, C.E., to prepare an amended scheme for the drainage of the town.

The Local Board of New Swindon resolved on Wednesday week to adopt plans prepared by Mr. W. Drew, their surveyor, for alterations to the sewage farm at Rodbourne. The estimated expense is £500.

The School Board for Ashford, East Kent, have accepted the tender of Mr. Fowler for the erection of new schools in the Beaver-fields, Ashford.

The tender of Mr. George Baines has been accepted by the School Board for Millom, North Lancashire, for the execution of alterations and additions to a school at Haverigg.

Mr. M. F. C. Turpin asks us to state that the carved oak chimney-pieces and parquet floors in the new buildings at Chelsea, described by us last week, were manufactured by him.

Works of drainage are about to be carried out at Denbigh. Mr. Clough is the engineer, and the first contract has been given to Mr. Jeffreys.

The Biggleswade Board of Guardians have instructed their architect to prepare plans for a brick small-pox hospital to contain 12 beds, and to cost less than £3,500.

New grammar schools are about to be commenced at Nunaton; Mr. Thomas Smith, of Eaton, is the contractor, for £3,150.

Our Office Table.

THE following private bills have come before the examiners at Westminster this week, and in each case it was decided that the standing orders of the House had been complied with:—The Electric Lighting Bill, which is to empower the Electric Lighting Company to break up, open, or interfere with any streets, public places, &c., in the metropolis, that may be necessary for the purpose of laying down their electric wires; the East and West India Dock Bill, which is to authorize the company to acquire additional land in the neighbourhood of, and for the purpose of extending, the existing docks; and the New River Company Bill, which is to enable the company to raise additional capital. In the case of the Tower High Level Bridge Bill, which came before the examiners on Saturday, and was adjourned, it was decided that the standing orders of the House had not been complied with, and the bill will therefore have to go before the Standing Orders Committee.

THE authorities of the City seem not to know their own minds. Some years ago they decided that Ludgate-hill was to be widened, and a magnificent view of the western front of the metropolitan cathedral was promised. Leases and houses were bought up at a considerable cost, and all the lower part of the hill was considerably widened by the setting back of the new houses. Soon, however, the railway bridge, which now obscures the view, was sanctioned by Parliament, and apparently but faintly opposed by the City. Still buying up and setting back of houses went on spasmodically, and no small amount of money was swallowed up. A rumour, however, has now got about, and events seem to prove its consistency, that the City is tired of its artistic fit, and that the widening of Ludgate-hill, which the necessities of traffic demanded as imperiously as the interests of art, is to be abandoned.

THE late Mr. John Johnson, a notice of whose death appeared in the BUILDING NEWS of the 3rd inst., was not only well known as an architect, but was also celebrated as a piscator. His demise is thus noticed in the *Fishing Gazette*:—"The death is announced of Mr. John Johnson, at his residence, 14, Buckingham-street, Adelphi. In the piscatorial world he has left behind him the name of a famous angler, and the books of the Piscatorial Society, of which he was a very old member, record some wonderful takes of fish in the earlier portion of his life. In the year 1866 he obtained the leading prize for the greatest weight of fish, there being a total of something like 550lb. placed to his credit. He was also, up to the time of his death, the author of the club, in conjunction with his old friend, Mr. Thomas Gillatt. There was a general expression of regret at the meeting on Monday evening last at losing so excellent a member, and the friendship of one whose kind, liberal, and hospitable disposition endeared him so deeply to all. Of late years he

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has not very frequently attended the weekly meetings; but on all other occasions he was to be found amongst his old associates. The late Mr. Johnson was also an old member of the Thames Angling Preservation Society, and for the last ten years as one of its general committee. In the architectural world he was well-known as an architect; and the Alexandra Palace at Muswell-hill is an evidence of his ability and skill in the profession he followed."

We have received a reprint of the address and papers read before the British Association at Dublin last year on "Rivers' Conservation." It is unnecessary here to again allude to the conclusions of the speakers. We gave an abstract of Mr. Edward Easton's address as president of Section G, the gist of which was the intelligent supervision and management of watershed areas as the most economical course to adopt. Those who desire to refresh their memory with Mr. Easton's able address cannot do better than obtain the pamphlet we are referring to, in which will be found papers read on "River Control," by J. Clarke Hawkshaw, C.E., and W. Shelford, C.E.; on "The Effect of River Works or Arterial Drainage Works upon River Floods," by James Dillon, C.E.; on "The Hydrogeological Survey of England," by Joseph Lucas; "The Discharge of Sewage into Tidal Rivers," by H. Law, C.E., &c. Many of these subjects have been noticed in our papers.

MR. SAMUEL TRICKETT writes as follows:—"I notice in your issue of the 17th inst., under the head of 'New Buildings in Chelsea,' you draw attention to the red-brick mansions abutting on Cadogan-square, building by Messrs. G. Trollope and Sons, and you state that 'The balcony is arched above with flat arches, supported on red Mansfield stone columns,' and that 'There is a pleasing harmony of contrast between the warm stone and the brick, which avoids the patchy effect a lighter stone would have had.' I fully agree with your writer in everything he says, with one exception—viz., that the stone is *not* red Mansfield but red Corsehill, which I have been introducing into London for some years, and it is the only red stone of fine even texture which retains its colour."

The manager of the Patent Selenitic Cement Company writes us as follows:—"In your article on the New Law Courts in the BUILDING NEWS, of January 17th you say—'We note that all the internal walls are plastered and finished with "Keene's Cement." We beg to say that they are plastered and finished with Selenitic Cement. Although we take it as a compliment to our cement that it should be mistaken for Keene's Cement (though costing far less), we rely upon your justice to make this correction.'"

A new railway, about twenty miles in length, was opened on Monday, from Okehampton to Holsworthy, and will, it is to be hoped, at no distant date be the means of carrying the London and South-Western Railway into Cornwall. The line was constructed by the

Devon and Cornwall Railway from plans of Messrs. Galbraith and Church, and has now been purchased by the South-Western Railway. Mr. Relf was the contractor, and the cost has been about £12,000 per mile. Passengers who are familiar with the present slow service and had accommodation from Plymouth to Penzance, will wish all success to the new venture of the South-Western Railway Company.

MESSRS. CHUBB AND SON, in a reply to the report furnished by Mr. James Hill to Colonel Wrottesley, on the state of the English lock trade, state that it is incorrectly assumed, both by the colonel and by Mr. James Hill, that all English locks are of one class, consisting "of a number of small parts exact counterparts of one another." In a superior quality of lock it is not desired to make a large quantity precisely alike, which any one of their keys will open, but rather to produce the greatest possible variety of combinations with different keys. In order to effect this a certain amount of skilled workmanship has to supplement the products of machinery, and will always continue to do so. Messrs. Chubb and Son assert that they were acquainted with the workmanship and finish of American locks long before contractors were tempted across the water by large discounts, and while readily acknowledging the general utility and neatness of these goods, they maintain that they show no improvements affecting real security superior to those effected in this country.

MR. THOMAS SOPWITH, M.A., F.R.S., F.G.S., who died at Westminster, on Thursday week, was born in 1803 at Newcastle-on-Tyne. He was for nearly 50 years extensively engaged as civil engineer in mining, railway, and other works, both in this country and on the Continent, and was the author of several works on architecture, isometrical drawing, and mining. In 1828 he was appointed commissioner for the Crown under the Dean Forest Mining Act, and in the same year a communication made by him to the British Association led to the establishment of the Mining Record Office. He was a member of many of the leading scientific societies, and one of the early members of the Institution of Civil Engineers.

SATURDAY was the last day on which the claims under the Epping Forest Act were received by the Corporation, who will now go forward with the work of hearing and adjudging. A case of some interest is at present occupying the attention of the arbitrator. It is that of Mr. Peter Mills, and bears reference to what are known as the "fuel assignments," under which a certain number of persons held permission to cut timber in the forest. The Corporation held that the right included only so much wood as could be used for personal fuel, and being unable to come to a settlement with Mr. Mills, referred it to the arbitrator. As there are several claims of a similar nature this is regarded as a test case, and the decision given will doubtless govern the arrangement of all "fuel assignments." It may be mentioned

that the reeves have been appointed for marking the commoners' cattle in all parishes except that of West Ham. A new road, according to the *City Press*, is being made from Chingford Station to Queen Elizabeth's Lodge. Labourers are already at work clearing out the ponds and levelling the ground. Queen Elizabeth's Lodge has now been formally handed over to the new conservators by the Government.

AN important manifesto bearing upon the present position of the slate trade—the staple industry of North Wales—was circulated by the executive council of the North Wales Quarrymen's Union on Monday. The trade, it is stated, has within the last six months got into one of the strangest and most sudden panics ever known, the present danger being lest the employers should endeavour to push matters too far, and take advantage of the stagnation to repeat their attack upon the union. The council complain of the apparent reluctance of quarry proprietors to continue the practice of making stock preparatory to a revival of trade, the men preferring to work such stock at a most reasonable price rather than having their hours shortened. Looking at the present state of affairs, and that the reason assigned for the reduction of wages and the shortening of hours is the inability of quarry owners to sell the quantity of slates made, the union has resolved upon voting to each member emigrating to America £3 for the first year of membership, and £1 for each succeeding year he has been associated with the organisation; double the amount to Australian and New Zealand emigrants, with a further premium of £2 to all emigrating west of Chicago or to South America. It is anticipated that many unionists will accept these offers, as there is no present prospect of any improvement in the trade, most of the smaller quarries remaining closed, while the larger ones are working only half time.

THE papier mâché enrichments, such as soffit and bed moulds, &c., manufactured by the Papier Mâché Company, are well known. But for the purposes of ordinary cornices in houses of moderate value they have been deemed by the majority of builders to be too expensive for general use, the consequence being that rough and inferior, but cheap, plaster casts have been used. The desire to reduce the cost of papier mâché enrichments, and to supply ornaments in every way superior to plaster, but at less cost than it, has induced the company for the past few months to conduct a series of experiments having this end in view. Having perfected the process, they now offer the large majority of their unperforated patterns of enrichments at half the previous prices. These enrichments are very light, sharp, and clean, extremely tough, being stronger and harder than wood or the ordinary papier mâché, easily and rapidly fixed with common brads to plaster, cement, or wood; they are indestructible and uninflamable; they will not, without deliberate violence, chip or fracture; they will not warp, shrink, rot, or decay; they weigh very little, pack very closely, and cost but a trifle for transport or shipment.

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THE BUILDING NEWS.

LONDON, FRIDAY, JANUARY 31, 1878.

THE ST. GOTHARD TUNNELS.

WE have already more than once described the progress and completion of the Mont Cenis tunnel, now a regular highway of traffic, hollowed between the Fourneaux and the Bordonnechian slopes from France into Savoy, of the Graian Alps. Those mighty works were long interrupted by many other causes than the physical difficulties, though these were many, and often surprising, encountered by the engineers. Yet, after the immense task had been accomplished, it was still felt that another had to be attempted, and, if possible, carried through. This was the piercing of the Alps, in the group of them geographically called the Lepontine, whose peaks are all above the snow line, and whose height varies from 7,000 to 11,000ft. above the level of the sea. Within a small distance from the celebrated hospital for the recovery of storm-overtaken travellers rise the sources of the Rhine, Rhone, Reuss, and Ticino. The way over the mountain—historians and gazetteers assure us—has been made the scene of many battles between French and Russians, and what not; but the work now approaching its result is plainly a tunnel, or series and system of tunnels right through and beneath, with a simple view to intercommunication from one to another of the populations divided by these granitic Graian Alps. The enterprise, it must be confessed, has been a long time afoot, but its promoters plead, reasonably enough, that instead of a single and simple hollow through the base of a mountain, beneath which they could make “both ends meet” with a mathematical exactitude astonishing even to the mathematicians themselves, they had to elaborate a labyrinth of passages, through hard rocks, shifting soils, bursting walls, and flowing waters, baffling and perplexing in every direction. They have now, indeed, after years of labour, brought their undertaking to not far from a practical finish—that is, they have excavated in round figures—wanting, however, only inches to be accurate—about twelve out of fifteen thousand yards through the hardest rock on the Switzerland barrier, and they have thus somewhere near three thousand yards of boring to accomplish. Not even so much as this might have been left undone had not the inevitable obstacle of finance arisen in the way. The Germans and the Italians profess themselves to be equally interested in the triumphs or successes of the engineers engaged; but upon the Swiss has been thrown, in a great degree, the practical part of the burden—though with these matters, it will probably be felt, the world outside that of the practical speculators can have very little to do. The grand points are—the objects and progress of these vast works—interesting to all Europe—and the prospects of their completion within a reasonable period. Besides the great leading tunnel, as we have suggested, there are many others—twelve, indeed—the shortest of which (Waren) is 1,106 yards long, while the longest (that of the Olberg) reaches to nearly double that distance. The total length of these subsidiary excavations falls not far short of ten miles. Then there are five minor tunnels—branches, as it were—of from 220 to 550 yards, and 25 between 110 and 220 yards, making in all 52 subsidiary tunnels, containing an aggregate line 16 miles in length. But the utmost height of the mountain is no measure of the depth beneath which the line of the tunnel is buried. The report says:—

“Between Immensee and Goscheneu there will be 33 tunnels; between Airolo and Gribasco, 17. The highest part of the line above sea-level is the big tunnel—3,307ft.; the lowest a point between Cadenazzo and Magadino—675ft. The line will be carried over 64 bridges and viaducts, the longest of which (that of Cadenazzo, in Tessin) will consist of five arches, each having a span of 55 yards. The total length of the Gothard line will be a hundred and fifty-five miles—17 per cent. of it being tunnels, and 1 per cent. bridges and viaducts. In the first instance, the line, for the greater part of its length, will be single; but the tunnels and permanent way are to be so arranged that additional rails can be laid down as soon as the financial success of the enterprise seems to be assured. If all goes prosperously, the entire sweep of iron road, beneath those mountainous masses, will be in available order within the next four or five years at the utmost. The contract for the stretch between Brünnen and Flüelen has just been assigned to a French firm, and few reasons appear why the enterprise should not henceforth progress triumphantly towards its accomplishment.” Thus far the official report, with the semi-official comments upon it.

The professional accounts we receive represent the work of piercing the mass of the St. Gothard Alp as differing, in some material respects from that of executing the Mont Cenis tunnel. The mountain to be penetrated presented greater difficulties; the course to be followed by the excavators was not so clear. The same natural resources, favourable at once to water and to blasting power, were not equally at hand. Nor could the different levels—strange though this may seem in a geometrical age—be taken with similar facility. So, at any rate, it is asserted in the somewhat apologetic report of progress before us. The directors declare that they undertook that which, at the beginning, was affirmed to be a chimerical task—that they have done, in less than a decade, that which Conté, the Italian engineer-in-chief, gave them half a century to do in—and that the penetration of St. Gothard by no means resembles or represents the labour of those who met—not beneath the base of Mont Cenis, it is true, but under that of a neighbouring mountain, where their hammers were heard clinking together, and their voices calling one to another before the last wall of division was broken through. Both the vertical and the horizontal measurements to be taken varied. The gradients were not, by any means, the same, nor was the amount of water to be encountered, or the probable flow of it, judging from speculative surveys on either side. All this made up a complication of obstacles which, within a year or two, may be hoped to have been happily encountered. For, it must not be supposed that, so soon as daylight breaks between one abyss in the St. Gothard mountain and another, therefore railway communication is at once to be established. The perforation, so far, will be merely a long, rough, narrow, shallow, zig-zag hole, opening at both ends, but needing to be rounded into an arch, planned along its surface, enlarged to proper dimensions, and strengthened to suit its ultimate purpose. Even during the preliminary processes, indeed, we find that very varying methods have been employed. There has been less of water pressures applied to the advancing shields, fitted into the cavity as it lengthened onwards from two opposite “attacking points,” in front of the gangs of excavators, and much more of gunpowder blasting, effected by drills through the rock, and the carrying off of débris along a line of rails following the workmen, moment by moment, over every yard of their progress. The cost of the undertaking, no matter

what measurement is taken, has been perhaps greater than that of what was believed to be the crucial burrowing beneath Mont Cenis; but, on the other hand, it is believed that the carrying on of similar operations will be considerably cheapened for the future. And there is a considerable advantage derived from the fact that a definite selection has at length been made from among the many routes preferred, at one time or another, by French, Swiss, Italian, and German engineers. There was one, favoured by the late Count Cavour, through the Valley of the Are, to Modena; another by that of the Dora to Susa, bearing with it, singularly enough, the idea of an American tramway down the slopes of the Swiss mountain. But they all gave way, first to the Mont Cenis, and, second, to the St. Gothard project, of which the one is a fact accomplished, while the other awaits only a fresh accession of effort to push it through. For geologists the later details from St. Gothard must possess a supreme interest, though it may be only permitted here to state that, as in the Mont Cenis excavation, the expectations of hidden waterfalls, dark caverns, masses of shifting sand, deep crevices, and so forth, have, happily, not been fulfilled. It was even supposed that huge iron and copper mines might present themselves by the way, tempting the labourers from their duty, and inducing them to dig downwards, rather than onwards, for their wages. No such discoveries have been made; no such alarms have been justified. It is true that the perforation of the mountain has, at times, gone on with disappointing slowness, though this has been due less to want of energy than to want of money to sustain it; and it is true also that, as in the Mont Cenis enterprise, the St. Gothard excavators have had perpetually before them the dim fear of some buried mountain lake, which might at any moment burst over their heads, but which, hitherto, has not done so, together with that of certain “boiling sands,” supposed to lurk in the same recesses; yet neither these nor the predicted waterfalls or swamps have prevented the steady movement of the rock-piercing machine, whether propelled by water, as beneath Mont Cenis, or in a great measure by steam, beneath St. Gothard. In the latter, however, a particular difficulty has had to be overcome, in even a greater degree than in the former. In both the heat and smoke generated by steam-engines are found to be almost insupportable, and the application of air power, suggested by the Genevese physician, Colladon, and brought into practice by the Savoyard, Sommeiller, in order, as he expresses it, to “tear out the entrails of the Alps,” has not yet gone sufficiently far to warrant any other than, so to speak, empirical expectation from it. In fact, to judge from the official report, it has broken more machinery in the St. Gothard tunnel than it has been able as yet to set in useful motion. To meet this problem, writes the practical author of “Il Trafforo delle Alpi,” it is essential to combine two powers—that of perforation with that of pressure—from both of which he excludes the action of steam, and in both of which he admits the action of pure hydraulics, though the engineers of St. Gothard have in so many ways repudiated them as applied to the dynamics of Mont Cenis. The point is very emphatically stated in the “Rapporto della Commissione Governativa,” just issued, which scouts the idea that the Mont Cenis and the St. Gothard tunnels belong to one and the same class in all particular essentials—that is to say, of engineering works. According to this statement, another substance, another temperature, have to be encountered, and most certainly, under the conditions, another machinery has to be employed. In the St. Gothard Tunnel, for

instance, the exact methods found efficacious in that of Mont Cenis, while it was in course of execution, for keeping out mischievous blasts of the atmosphere, or floods of water, failed entirely, while the work of upholding the tunnelled arch as it made its slow way through the masses of rock and of friable substance, has been altogether different. Where, for example, brickwork was necessary in the former case, to prevent fragments from the friable roof falling, to the inconvenience of the work, a simple indiarubber shield has been found sufficient in the latter. Still, neither has been found adequate to keep out the incessant drip which, the report alleges, keeps the work back an inch where it should be going forward two. It is the result of this which has to be watched for, has to be carried off, must be foreseen and provided against by a hundred mechanical contrivances, a failure in any one of which might delay operations for a month. Thus, an advance-guard of explorers endeavouring, only a few days ago, to secure an arch of masonry, lining a cutting through the natural rock, failed to perceive a stream of damp pouring through a fissure, and the entire mass of masonry came down at their feet almost before they had time to escape from it. They still complain, however, in the St. Gothard that they are exposed to gunpowder fumes, suffocating in the narrowness and dampness of that excavation, and that their task is thus rendered both dangerous and slow, as all such labour, indeed, must necessarily be. But it is necessary, at all times, to bear in mind the circumstance already pointed out, and which is insisted upon, with equal emphasis, by the French and the Italian engineers—that these two vast enterprises, though both of them were designed to construct practicable roads through the Alps, instead of over them, are not, in the strict sense of the term, parallel undertakings. They differ from, in point of fact, in almost as many respects as they resemble, each other, though, undoubtedly, they have a common object with a result in view which science, mechanics, and civilisation would alike welcome as a triumph.

THE BUILDING ACTS' AMENDMENT ACT.

AFTER a considerable lapse of time the Metropolitan Board of Works have given notice of their intention to apply to the Secretary of State for the Home Department for a confirmation of the new bye-laws. These have been published, and we may now take a general view of the amendments proposed, as they will affect buildings within the jurisdiction of the board. First, as to foundations and sites, it is enacted that "no house, building, or other erection shall be erected upon any site or portion of any site which shall have been filled up or covered with any material impregnated or mixed with any faecal, animal, or vegetable matter, or which shall have been filled up, or covered with dust or slop, or other refuse," or upon which any such matter has been deposited, unless such matter or refuse shall have been removed, any excavation being filled up with hard brick, rubbish, or similar material. The above provision will effect certainly a vital reform in the sanitary welfare of the metropolis; but so far as we can see, there is one case the wording of the clause will not touch—namely, a site already impregnated with old cesspool or leaky drain matter. The clause simply prohibits building on a site which has been "filled up" or "covered," and does not apply to sites in which the mischief exists in the native soil. If, instead of the words introduced, the clause ran, "any site in which old drains existed," &c., every conceivable

form of danger arising from the soil would have been met. But we find a layer of concrete, 6in. thick, smoothed on the upper surface, is to cover the site; and this will mitigate, if not quite exclude, any dangerous emanations. With regard to footings, we find in future every builder must lay his footings on a "bed of good concrete, at least 12in. thick, and projecting 6in. on each side of the lowest course;" but it is not very clear whether all walls are intended: we take it to be so. Is this necessary in all cases in addition to the layer previously mentioned? How many builders, we wonder, will not think this a useless restriction? That the concrete be real—not a mixture of rubbish—another clause provides that the material (gravel or hard brick) be approved by the district surveyor, and that the proportion of lime or cement be 1 to 6, or one of cement to 7 of other material. Even this clause the cunning builder might evade, however; for it only says the gravel, or hard material, is to be approved, the lime being exempted from inquiry, as also the mode of mixing.

On the substance of walls we find some bye-laws that will make good many of the flagrant omissions of the present Building Act. Thus we find in brief the walls of every building shall be constructed of "good, square, hard, sound, and well-burnt bricks or stone" properly bonded; that good mortar, composed of good lime and clean sharp sand, properly washed, or grit in the proportion of 1 of lime to 3 of sand or grit, shall be used; that cement should be Portland or other cement of equal quality, "weighing not less than 112lb. to the struck bushel and capable of maintaining a breaking weight of 350lb. per square inch, after being made in a mould and immersed in water for seven days;" that stone used must weigh not less than 110lb. per cubic foot, be free from vents, &c., and laid on its natural bed; that a damp-proof course of asphalt be laid throughout the thickness of every wall "at a height of one foot above the base of such wall where there is no basement, and at a height of one foot above level of ground where there is a basement or half basement story;" and lastly that the top of every party wall and parapet wall shall be finished with a course of hard well-burnt bricks set on edge in cement, or by a coping waterproof and fire-resisting. It appears hardly credible that such necessary clauses should have been ever wanting in the former Act, for they are simply what every architect's specification requires; and we may well shudder to think how many rotten, ill-bonded, and dangerous walls have been suffered to be built during the last 50 years.

The next sections, 3 and 4, relate to the duties and fees of district surveyors, but we would incidentally remark that the present organisation is manifestly unable to cope with the duties of inspection. We have only to walk round some of the metropolitan districts to see that buildings are erected and occupied without even a visit from the surveyor or his deputy, and we point to the almost universally admitted necessity that qualified inspectors should be appointed in every district, to act under the surveyor, for we know that many faulty buildings and dangerous structures come to the knowledge of the surveyor indirectly, and not from examination. Sections 3 and 4 are as follows:—

It shall be the duty of each district surveyor, on receiving notice of any house, building, or other erection, or alteration, or addition, or on his becoming aware that any house, building, or other erection or alteration, or addition, is being proceeded with, but in respect of which no notice has been given, to see that the provisions of the foregoing bye-laws are duly observed, and to see that the terms and conditions of any permission are complied with (except in cases where the board may have dispensed with the observance thereof).

As to the fees to be paid to district surveyors,

in every case in which proceedings may have been taken by the district surveyor to prevent the erection of any house, building, or other erection upon any site, not in accordance with the provisions of the bye-laws, in relation to sites, and in which the site may have been subsequently made conformable to the provisions of such bye-laws, there shall be paid to such district surveyor a fee of 10s. for each house, building, or other erection, erected on such site, in addition to any fee to which he may have become entitled under the provisions of the Metropolitan Building Act, 1855.

Section 5 relates to the deposit of plans and sections, from which it appears that on notice being given to the district surveyor of the erection or alteration of any public building, plans and sections of such building be deposited with the surveyor for his inspection, that 7 clear days must elapse before any work is proceeded with; and in respect of houses or alterations of buildings other than public buildings, the district surveyor has power to require the production of a plan or plans and sections for his inspection, and no work is to be proceeded with until such production of plans has been complied with. Section 6, as to the deposit of plans and sections of buildings to which section 56 of the Metropolitan Building Act applies, makes it compulsory for every person, who wishes to erect a furnace, chimney-shaft, or to build in concrete, to deposit plans and sections of the same with the surveyor, to be retained by him, and if the surveyor is satisfied that such building is to be constructed in conformity with certain rules he may permit its erection, but the Board reserves power, where the surveyor has declined to grant permission, to permit its erection. We here give the gist of the rules in each case. As regards furnace chimney-shafts of every kind, brick and mortar, or cement of the best quality, is required; the foundations to rest on a bed of concrete; the shaft at the base, if square, is to be at least one-tenth of the total height of shaft; if octagonal, the external width to be one-eleventh of height; and, if circular, one-twelfth of the height. A batter is to be given to the shaft of 2½in., at least, in every 10ft. in height; the brickwork to be at least 8½in. thick at top for 20ft. below, to be increased 4½in. in thickness for every 20ft. of additional height, measured downwards; the footings to spread equally all round by regular offsets to a projection equal to the thickness of the enclosing brickwork at base, and no portion of the enclosures of a shaft shall be constructed of fire-brick, any lining of that material being in addition to the thickness and independent of brickwork. No cornice is to project more than the thickness of the brickwork at the top of shaft, and it is further ruled that no iron cap shall be less than 1in. in thickness, and must be held down by iron bolts.

The rules relating to concrete buildings are important. The ingredients to be composed of Portland cement, with clean Thames ballast, clinkers, or any hard material, each to be passed through a mesh not exceeding 2in. diameter. Sand must be added to such materials in the proportion of 1 to 2; the mixture must be in the proportion of not more than 6 parts of material to 1 part by measure of Portland cement. In making the concrete, a box of 2ft. x 4ft. x 2ft. is to be used for the materials, and another holding one sack or half a cask containing two bushels of the cement, the ingredients being turned over at least three times, and thoroughly mixed together with water. The walls to be carried up in regular layers, grouted in cement and sand of 1 to 2, the grout to be made as mortar, and then thinned. The thicknesses of walls are to be equal at least to those for brickwork prescribed; cores to be provided for flues and recesses; and doors and window frames to be built into the walls. Above the roof the stacks and party-walls

to be rendered in cement. In respect of fees it is provided a fee of one-half more be paid to surveyor than the fee he is entitled to for new buildings or additions. There is little in these regulations that can be objected to, though they rather interfere with any special system of concrete building.

Clause 7 empowers the board to remove any house or building not constructed in accordance with these bye-laws or other terms and conditions, after notice shall have been given either by the board or district surveyor to alter or pull down to the occupier, owner, or builder, and the same remains uncompleted within 28 days after service of notice. Penalties for breach of any of the bye-laws not exceeding 60s., nor less than 20s. for each offence are to be enforced, and in case of a continuing offence a further penalty, not exceeding 30s. nor less than 20s., for every day after notice from board or surveyor. The board, however, reserve to themselves the power to dispense with the observance of any or either of the bye-laws under conditions they may think proper. This discretionary power is very necessary if acted upon with impartiality and justice, and will tend to allay any feeling of opposition to bye-laws that will appear to many as a further encroachment upon private interests or restriction of enterprise by the board. We may just remark, however, that the intention of the original framers of Metropolitan Building Acts was evidently to guard against the erection of buildings of a combustible nature, and not to frame a code of building regulations perfect in all respects. This is evident from the fact that the first legislation in this direction, in the reign of Charles II., had reference to a prevention of fire, and arose after the Great Fire of London. In Queen Anne's reign other Acts were passed, the chief object of which was to prevent fire, and to regulate the construction of party walls, and during the Georges' era several repeals of former statutes took place—all of which, by their titles, show clearly that the principal aim was the regulation of party walls, flues, and other structures, with the intention of reducing the risks of fire. The old Act of George III., indeed, incorporated the provisions of former statutes, but was always a stumbling block to lawyers and builders. It was a clumsy patchwork at the best, and acute builders were not slow in evading its provisions. It is high time, therefore, that rules of a more general nature should be introduced, and till we have a more scientifically-constructed code, we must take the proposed bye-laws as the only alternative rendered necessary by the increasing exigencies of building in the metropolis.

ARCHITECTURAL GEOLOGY.—II.

SECONDARY FORMATIONS.

UNDER this title English geologists have included all those strata of the earth's crust which lie between the newest member of the cretaceous or chalk formation and the oldest of the new red sandstone series. They are composed for the most part of solid rocks, possessing more or less hardness—many of them yielding excellent building stones, while others are valuable only for burning into lime. Beds of clay and sand also occasionally occur.

Chalk.—In this country the cretaceous series is the one which in point of antiquity appears to immediately have preceded the "London clay," since one or other of its members is always found below that deposit, having been reached at a depth of 160 feet by boring in the centre of London, and within 70 feet at Harwich. But although this series is always to be met with below the London clay, yet the latter is not always found overlying it, as the chalk

comes to the surface over a large portion of the eastern and southern counties, but in some cases is covered up by a deposit of "drift" or "alluvium," as alluded to in our previous article. In fact, this formation is one of the most extensive in the world, and appears to have been originally deposited in a deep and open sea, consisting, as it does, mainly of minute shells and other organic remains. In England we find it near the surface as far north as Flamborough Head, in Yorkshire; and on the south coast, stretching from Margate on the east to the borders of Devon on the west; it covers a large portion of the East Riding of Yorkshire, forms the wolds of Lincolnshire and the greater part of Norfolk, with parts of Suffolk, Cambridge, and Hertford. It also is seen in the counties of Buckingham, Oxford, and Berks, and over a large portion of Wilts, Dorset, and Hampshire. In Sussex we find it extending along the coast, in a series of undulations, from Beachey Head to Littlehampton; in Kent it may be seen all over the north and east districts; and it forms a great portion of the range of the Surrey hills, around Caterham, Epsom, Rugall, Dorking, and Guildford. In many of these districts the chalk is obtained close to the surface, but in others it is necessary to dig down to it through the more recent deposits of gravel, sand, or clay. The upper, or white chalk, is a soft limestone, of which 98 per cent. is pure carbonate of lime, with nodules and bands of flints, consisting of nearly pure silica, but quite free from layers of sand or pebbles. In Buckingham and the neighbouring counties the upper chalk, with flints, attains a thickness of 300ft., below which is a thin layer of hard chalk rock, and then from 400ft. to 500ft. of chalk without flints. In the counties of Oxford and Berks the chalk rock is from 6ft. to 12ft., while in Wilts, and at Weymouth, in Dorset, it is 800ft. thick. In Surrey its thickness varies from 350ft. to 500ft., and in the eastern parts of Kent and Essex it reaches 800ft. Under London the average thickness of chalk is 640ft. The upper chalk is not generally fit for use as a building stone, but is extensively employed for making lime—producing a rich or fat lime, which will only set firmly in dry air when used as a mortar. The soft chalk is also in many places made into "whiting," by grinding it with water to a fine pulp, allowing it to flow into a series of tanks, and then forming the sediment into cakes, and allowing them to dry. The flints, which may be obtained in large quantities from the chalk, are much used in their own localities for walling, and also in the manufacture of porcelain and glass. The places near London where chalk with flints is obtainable are—Lewisham, Charlton, Greenhithe, Gravesend, Bromley, and Chislehurst, in Kent; Purfleet and Grays, in Essex; Sutton and Croydon, in Surrey. Blocks of sandstone of considerable size are sometimes found embedded in the chalk, and are used for building purposes. The chalk obtained at Reading and Kintbury, in Berkshire, and also that from Hesse Cliff, near Hull, is used for making lime and whiting.

The lower, or hard chalk, is often quarried as a building stone in Norfolk, as at Stoke Ferry, Hunstanton, and at Markham, near Swaffham, while that at Cromer and Trunch, near North Walsham, is only used for lime. In Suffolk we find chalk boulders embedded in the gravel and clay which can be employed as building stones after being hardened by exposure to weather and frost. The Totternhoe stone of Bedfordshire is a hard and brownish sandy chalk, which has been much used for building in Dunstable, Luton, and the neighbourhood; but it is only adapted to interior work which is not exposed to the weather. The Beer stone, found near Axminster, is also a hard chalk,

and has been largely used at Exeter and its neighbourhood in building the cathedral and other edifices. In Wilts the chalk is quarried for building stone at Netherhampton and Alton, near Devizes; and in Hampshire there are numerous quarries in different parts—as at Basingstoke, Andover, Kingsclere, Winchfield, Sherborne, and Whitechurch—the softer chalk being used for lime and the harder as a building stone. In Sussex the chalk quarried near Steyning has been employed in building the priory and other edifices at Lewes; and in Surrey that obtained at Shalford, near Guildford, is much used as a building stone in the locality. At Saxby, near Grantham, a hard chalk is also quarried as a building stone.

Upper Greensand.—This name is given to a small set of beds, varying from 20ft. to 80ft. in thickness, which in some places is found at the bottom of the upper chalk, and consists of greenish-grey sand and sandstone. It is chiefly noted for the "firestone" which is obtained in Surrey, about Merstham, Reigate, Betchworth, Godalming, and Godstone, where it is quarried in slabs about 10in. thick—which are used for floors of glass-furnaces, backs of fireplaces and stoves—and is occasionally employed as a building stone in the neighbourhood of the quarries. It is chiefly known in London as "hearthstone," being used for cleaning hearths and other stonework. In Sussex we find these beds yielding a sandstone at Pulborough, with which Arundel Castle and other buildings in the locality have been erected; also a similar stone at Coultershaw, which has been used in Tillington and Petworth churches. A stone of a chalky appearance, called "Malm rock," is also found in Sussex, at Petersfield, Pulborough, and Hassocks-gate, and near Alton, in Surrey, where it is used as ashlar facing and for chimney-pieces. In the Isle of Wight these beds yield a calcareous sandstone, quarried at Shanklin-down and other parts as a building material. In Dorset the beds of greensand are conspicuous—a yellowish-brown sandstone being obtained at Lyme-Regis, and a calcareous sandstone grit near Chard. A siliceous bed of building stone, about 5ft. thick, is found at the base of the chalk near Widworthy; and beds of sandstone, with brown and grey sand below, are quarried in North Wilts, near Devizes and Seend. In Berks this formation consists of soft dark greensands, 20ft. or 30ft. thick, overlying some beds of a whitish siliceo-calcareous stone, which is quarried near Wantage and Wallingford.

Gault is a stiff blue clay—sometimes calcareous and micaceous—chiefly valuable for making into bricks, tiles, drain-pipes, &c.—and is found between the upper and lower greensands. Its greatest thickness is in Oxford and Berks, where it is 250ft.; and in Bucks it is 130ft. thick. At Maidstone its thickness is 150ft., and at Folkestone and in the Isle of Wight it is 100ft. Under the middle of London it has a thickness of 130ft., below the London clay; while at Harwich, under the same formation, it is only 40ft. In Norfolk it is found at Stoke Ferry, and is 24ft. thick at Norwich. In Wilts the gault varies from 80ft. to 140ft., being made into bricks at Devizes, Warminster, Downton, Trowbridge, and Westbury. In Cambridgeshire the clay is 150ft. thick, pits of it being worked for brick-making at Barnwell. In Kent there are extensive works—at Maidstone, Aylesford, and Burham—of brick, tile, drain-pipes, and terra cotta, manufactured from the gault clay. At Shaftesbury, in Dorset, the gault contains a valuable bed of sandstone, which is much prized in the locality for building, on account of its power of resistance to weathering.

The **Lower Greensand** consists chiefly of beds of sand with calcareous sandstones,

some of which are largely used for building purposes, as the "Kentish rag" and the "Bargate stone," the former of which is found in Kent, at Hythe, Folkestone, Godstone, Maidstone, and Boughton, together with a sandy stone known as "Hassock," and used as a backing to walls faced with the "rag." The Kentish rag contains 92½ per cent. of carbonate of lime, and 6½ per cent. of earthy matter, with small quantities of iron oxide and carbonaceous matter; while the Hassock has only 53 per cent. of lime, with 32 of silica, 4 of alumina, and 8 of iron oxide, with phosphates in small quantities. The Bargate stone is a calcareous sandstone or grit, found in Surrey, near Godalming and Dorking, being used for walling in that neighbourhood. In Norfolk some hard beds of stone, suitable for building, are obtained from the greensand, together with beds of red and white sand. Valuable beds of gravel are found in this formation in the vicinity of Woburn, Leighton, Ampthill, Sandy, Wicken, Potton, and Upware. In Wilts it yields calcareous sandstone at Lonsdale; red or yellow ferruginous sand and gravel at Swindon; and at Farringdon, gravel, sand, and hard beds of stone used as millstones.

The *Wealden* formation is so called from being chiefly found in the "Weald" of Sussex, and in adjoining parts of Kent and Surrey, where the chalk which at one time covered it up has been entirely swept away. It is a fresh-water formation, consisting mostly of clay or shale, brown or blue, with occasional beds of sand and sandstone, and a highly fossiliferous limestone, sometimes called "Sussex marble," which has been much used in the older churches of the Weald. The "marble" is found near Beddenden, Staplehurst, Crowhurst, Chiddingfold, Petworth, Betherden, and Clayton. At Horsham is quarried a calcareous sandstone, capable of being split into thin slabs, and much used in the neighbourhood for walling, paving, and roofing; the same kind of stone is also worked near Itchingfield and West Grinstead. The Tilgate stone, obtained near Horsham, is also used for local buildings, and a similar one is quarried near Hastings, and at Wadhurst near Tunbridge Wells. Beds of sandstone, impregnated with bitumen, are found at Chichester, and are said to have been used in building Pevensey Castle. The Calverly sandstone, obtained near Tunbridge Wells, has been largely used for the local buildings; it contains 94 per cent. of silica, with iron, magnesia, and alumina. A sandstone found at Edenbridge is used in local buildings; and at Battle the Sussex limestone is burnt into lime.

The clay of the *Wealden* is used largely in many parts of Sussex and Surrey for the manufacture of bricks, tiles, drain-pipes, and pottery, as at Hastings, East Grinstead, Lewes, Burwash, Petworth, Midhurst, Burgess-hill, Reigate, and Dorking. The Weald clay is also used for similar purposes at Weymouth, in Dorset. The thickness of this formation is very variable, being greatest near Leith-hill, on the south-west of Dorking, where it is 1,000ft. To the north of Flamborough Head, in Yorkshire, there is a bed of clay supposed to belong to this formation, in which are found large quantities of septaria, much used in cement manufacture.

EGYPT UNDER THE PHARAOHS— DERIVED FROM THE MONUMENTS.*

IT is surprising how archaeological research is undermining the reputed authenticity of the old historians, but in no domain of inquiry do we find the conflict

between fabulous narrative and the testimony of the monuments so remarkable as in that of Egyptian antiquity. Young and Champollion were probably the earliest who tore the veil of tradition and obscure written history from the contemporary records of the land of the Pharaohs, but to Dr. Henry Brugsch-Bey we must ascribe the honour of having divested the Egyptian records of the unreliable and coloured accounts that for ages have obscured them. The other day it was our pleasing task to notice briefly Dr. Birch's edition of Sir Gardner Wilkinson's interesting work on "Egyptian Manners and Customs." It is now our duty to introduce to our readers a work on the "History of Egypt under the Pharaohs," based entirely upon the monuments. This task was undertaken by Dr. Henry Brugsch upwards of twenty years ago, and we have now a translation from the German of his great work, completed and brought down to the present day, by the late Henry Danby Seymour and Mr. Philip Smith, B.A., and published by Mr. John Murray. Of course, it would be absurd to attempt in our brief review anything like a complete sketch of Dr. Brugsch's work. The editor premises, "in rendering into English Dr. Brugsch's German translations of the Egyptian texts, that there has been a twofold difficulty, chiefly from the obscurity of the originals, and partly also from the archaic German often used by Dr. Brugsch to imitate their style." He also refers to the author's long and deep study of Egyptian antiquities, his knowledge of the life and character of the people and the Court of the great Pharaohs, which has enabled him to set in the clearest light the hierarchy, the details of administration, the works of artists, and the connection of Egypt with other nations at the principal epochs of her history. Dr. Brugsch's great work, in short, is a history of Egypt under the Pharaohs, derived from the monuments. Its aim is chiefly to interpret the stone records of a remote age by the light of recent investigations. Of course, we must rest the value of the work chiefly on the fidelity of the translations, which the author observes he has taken the greatest pains to insure. Dr. Brugsch rejects as erroneous many opinions hitherto held by Egyptologists—such, for instance, as a Pelasgo-Italian confederacy of nations in the time of Minephthah I. and Ramses III., and the connection of Ilum and the Dardanians with Egypt in the fourteenth century B.C. Another fact he commends to the student is that the "Egyptian monuments of the date 1000 B.C. and onwards bear witness for the first time to a knowledge of the names of Assyrian kings in the Egyptian form of writing, and attest the presence of Assyrian satraps in the Nile Valley." Thus Panrshus (Parashus), Pallash-nisu, Shashanq, Nimrod, &c., appear in close connection with Egyptian history. As to chronology, the author remarks—"The monuments are now beginning to discredit more and more the numbers of Manetho," whose lists have been taken as authoritative. We dip into the introductory chapter, and find the author writing that the "Tables of Kings" of Saqqarah and Abydos furnish undoubted evidence that the "primitive ancestors of the Egyptian dynasties—the Pharaohs of Memphis—must be greeted as real historical personages, and that King Ramses II. (about 1350 B.C.)—the Sesotris of the Greek fabulous history of the Egyptians—was preceded by at least seventy-six legitimate sovereigns." In other words, there were so many generations of men who lived during a space of time which is greater than the years that have elapsed from Ramses II. to the present day. Such a period of time is truly impressive, and gives us an idea of the astounding age of

Egyptian history and the monuments which mark it—the Pyramids of Memphis. Referring to the origin of the Egyptians, about which there has been much controversy, Dr. Brugsch rejects the Ethiopian origin, believes in the Asiatic beginning of the people, and, as he says, comparative philology has strongly supported the idea that the primitive roots and elements of Egyptian grammar point to an intimate connection between the Indo-Germanic and Semitic language and races. The Ethiopian style of art, as shown by its monuments, carries the conviction, moreover, "that we can recognise no special quality beyond the rudest conception and the most imperfect execution of a style of art originally Egyptian." The oldest starting point in the long series of stone buildings on the banks of the Nile is found in the Pyramids at the apex of the Delta, while on proceeding southwards the stamp of antiquity vanishes from the existing monuments. Chapter III. enters into some interesting facts bearing upon prehistoric Egypt. So far, we are told, as the surviving monuments reach back, their beginnings coincide with the first age of the stone period, which the "scientific student has invented to bridge over the historical chasm with a tangible fact." The prehistoric period was filled up with mythical inventions. Three ages were imagined till the time of Mena, one in which a dynasty of gods reigned; then an age of demi-gods; and thirdly the dynasty of the mysterious Manes. Theology, of course, filled these ages with deified beings. We have, for instance, confirmation in the monuments of the dynasty of the gods. Thus the god, Patah, of Memphis, whom inscriptions call the "father of the gods," is the architect in the highest sense of the word—the word Patah signifying "architect, former, constructor." On the temple of Denderah the inscribed words call the god "the chief of the society of gods who created all being." On the walls of the Temple of Isis at Philæ a similar appellation is given, and the monuments—both Egyptian and classical—prove the supreme place of this god at the head of god-kings. Ra, son of Patah, is represented as the Sun, the representative of light and fire in the series of the four elements; Thui (the air) represents the idea of emptiness; Seb (his son) appears in monuments as the personified image of the earth, the third element, and corresponded to Saturn; Osiris (his son) represented water, and was the symbol of existence completed, the past; Set, the son of Seb, typified the annihilation of being; and lastly Hor (Horus, Apollo) the son of Osiris and of his wife Isis, symbolised the return of completed existence, the new life, the morrow or the future. These names of royal or king-gods are of constant recurrence in the records of Egypt of every period. Of the two fabulous dynasties which succeeded, the monuments preserve little, and the author regrets that the fragments of the Turin papyrus, once containing the most complete list of the kings of Egypt, have not preserved the slightest intelligible information respecting the fabulous successors of the king-gods.

We commend to the perusal of all students the author's interesting remarks on the chronology of the Pharaohs, Chap. IV., in which it will be seen how wide the computations of scholars have been in fixing the date of accession of the first Pharaoh, Mena. The difference between the extreme dates is no less 2,079 years. Thus Boeckh puts it at 5702 B.C., and Bunsen at 3623 B.C. According to Brugsch the account given by the Egyptian priest, Manetho (now lost), was largely corrupted by the ecclesiastical writers who, in error or designedly, falsified the names or numbers. We may simply add that the author has given a chrono-

* A History of Egypt under the Pharaohs, derived entirely from the Monuments. By HENRY BRUGSCH-BEY. Edited by PHILIP SMITH, B.A. 2 volumes. London: John Murray.

logical table, partly compiled from the table of Abydos, based upon the assumption that it is only from the beginning of the 26th dynasty that the data can be considered correct, and assigns the year 4400 B.C. as approximately true.

It is worthy of note that the temple, among the Egyptians as among other ancient nations, formed the centre of every new town, which was built round it. When a new temple was erected a town was soon formed. Thus Memphis, the great capital of the ancient empire, was founded by Mena. The river Nile was diverted for the purpose, its ancient bed filled up, and an enormous dyke was constructed by which the river was carried more to the east of the Libyan chain, and to this day the waters of inundation are restrained from overflowing by its means. "The office of architect," we read, "was the occupation of the noblest men at the king's court. Pharaoh's architects (the *Mur-ket*), who were often of the number of the king's sons and grandsons, were held in high honour, and the favour of their lord gave them his own daughters out of the women's house as wives." We cannot afford space to quote the list of the Pharaohs' architects which time has spared, but they show the importance attaching to the office at that remote period. The successors of Mena are detailed, and there is much to interest the student in the succeeding chapters. Thus the Pyramids of Gizeh are made the subject of some very graphical remarks; their dimensions, as given on the authority of Col. Vyse, show them to differ in breadth and height, and the author solves the enigma of their erection in the only reasonable way—namely, that the pyramid was the outer shell of an inner kernel or sepulchral chamber for the reception of the king's sarcophagus, and that the external structure was added, stone by stone, in a series of steps, while the Pharaoh still lived till it was so huge that no further extension could be made, when a casing of hard polished stone fitted into the steps covered the vast mass. Thus these gigantic monuments grew in size with the king's enjoyment of the sun-god Ra, or during life, commenced as soon as he began to reign, and continued with a firm faith in the eternal resting-place of the body. Each pyramid had its special name. There were the erections of Khufu, of Khafra, and of Menkara. The discoveries of M. De Rougé form an interesting feature in these chapters, and the reader will find the monumental history of the Pharaohs of the 12th dynasty replete with important evidence of the great age of the Usurtasens. The buildings at Heliopolis or On, the monuments at Karnak, the tombs at Beni Hassan, the site of Lake Mæris, are made to illustrate the life and character of this important period of Egyptian empire. Architecture, as M. De Rougé says, shows "inconceivable perfection in the cutting and placing of blocks of great dimensions. The passages of the Great Pyramid remain a model of exactness of building which has never been surpassed." The bas-reliefs of the tombs give us the only idea of the exterior style of the temples of this first epoch. One sole motive of ornament is combined with the severe outline—namely, two lotus leaves placed opposite to each other. The figures and statues have a broad proportion which gradually becomes thinner; the colouring is delicate, and the limestone statues often entirely painted, while those of granite only partially—as the eyes, hair, and drapery. Dr. Brugsch objects to the deprecatory tone of most art histories in speaking of this time, and he says it arises from the complete ignorance of the critics, and from a superficial way of looking at the art. "Egyptian art is art in the noblest meaning

of the word," but it is fetter-bound by traditional usage and rules. The author fully agrees with the criticism of Lepsius in his work "On Some Egyptian Art Forms and their Development," and his answer to the deprecatory judges. Dr. Brugsch also enlightens the art critic who has regarded Egyptian art as mechanical in style, and who believes Egyptian masters never existed. He imputes this idea to ignorance of Egyptian inscriptions, and reminds us that the artist was the most honoured man in the empire, and stood close to the Pharaoh. An illustration of this is found in the inscription on a tomb of an old artist named Martisen, who lived 44 centuries before our time. He calls himself "a master among those who understood art and a plastic artist who was a wise artist in his art," and relates his acquirements. His son, Usurtasen, of whom a pedigree is given, shows that father and son occupied an important position in the arts of the 12th dynasty, and, it is thought, opened the age of highest art development in the old empire.

We pass over several chapters on the irruption of the Hyksos or "Shepherd Kings," at the end of the 13th dynasty, the period of foreign dominion of the Hyksos, and time of Joseph's sojourn in Egypt, during which the monumental records are comparatively silent or obscure. In the 18th dynasty, dated 1700 B.C., we have the building of the great temple at Thebes; records of the Thutmes, Queen Hashop, and her distinguished architect, Semnut, whose buildings are described as the most brilliant and tasteful which were ever erected by Egyptian artists. Thutmes III. reigned 53 years, and was the Alexander of Egyptian history, and from the inscriptions and representations on the temples and obelisks Dr. Brugsch gives us a very lucid picture of the exploits and victories of this mighty monarch. Many of these inscriptions are in a high-flown style. The magnificent temple of Amon at Ape, and the stupendous Hall of Pillars (Khu-mennu or "splendid memorial"), were built by this king, who certainly added more than all other royal builders to the great temple at Karnak. It was during this period, the 16th century before our era, that architecture reached a climax, and excelled in the qualities of mass and sublimity beyond any that followed it. From the southern boundary of Africa to the Mediterranean coast, the ruins of this great dominion still attest its power, and the author describes many of the most important of the temples, and some of the leading architects whose names are inscribed. We may mention Mer, Rois, Amenemant, Amenhotep. We can but glance at the second volume. The reign of Mineptah I. (Sethos) 1366 B.C., was another brilliant one. The monuments once more reflect the victories of the empire, and the temple at Thebes is the prominent landmark. The "Great Hall" at Karnak, with its 134 columns of immense size, still astonishes the traveller; the temple of Osiris at Abydos, and the tomb of Seti, are master works of building, sculpture, and pictorial inscriptions; and the celebrated Table of Abydos, with its list of 76 kings, is important historically. During the reigns of Ramses II. and Mineptah II., the monuments are inferior as works of art, though in Nubia Ramses built many towns and temples, while the rock-cut temple of Ibsambul has remained the wonder of ages. To Ramses III., the "Prince of Heliopolis," may be ascribed the temple of Amon at Medinet Abu, a new Ramessesum dedicated to Amon, but we refer the reader to the author's work. The great Harris papyrus—a new edition of which Dr. Birch has recently given to the British Museum—will always form the most important contribution towards the reign of the third Ramses. In his successors' time architec-

ture fell into insignificance; we can only mention the names of Ramses IX. and the chief priest and architect, Amenhotep, recall the gradual waning of Egyptian power during the 21st dynasty, the foreign irruptions and fall of the Egyptian monarchy in the 26th dynasty, till the period when the history of Egypt gradually merged into that of Greece, or about the sixth century B.C. Art then assumed a greater elegance—a neatness and fineness in execution; the capital of Alexandria succeeded to Thebes, Memphis, and Sais—Persian arms and prowess to the rule of the Pharaohs: and from this point we must continue the narrative with the conquests of Alexander the Great. We will only add the book Mr. Philip Smith has edited for us will be read with great interest by all Egyptian scholars and antiquaries, throwing, as it does, fresh light on many an obscure page of Egyptian history. The volumes are illustrated by coloured plates—one a representation of a tribute from a tomb at Thebes—a portrait head of a wooden statue of an Egyptian ascribed to the 4th dynasty, found at Saqqarah, maps of Upper Egypt, and various valuable genealogical tables, lists of kings, &c.

ARCHITECTURAL ASSOCIATION.

WE publish this week the second portion of Mr. Blashill's paper on "Party Walls: the Law and the Practice," read at the last meeting of the Architectural Association, and the subsequent discussion, in continuation of our report in last issue, pp. 86-8: As to the whole of the rights that are given to the building owner, the author explained the Metropolitan Building Act provides that he shall not exercise them in such manner or at such time as to cause unnecessary inconvenience to the adjoining owner, and we have already seen that the surveyors are to determine the time and manner. The rights of the adjoining owner, as affecting the party structure, are as follow: He may require the erection thereon of certain chimney-jambes, breasts, or flues, or certain piers or recesses, or any other like works for his own convenience, and the building owner must do this if it will not be injurious to him, or cause unnecessary inconvenience or delay. The adjoining owner may require these works to be done by giving a notice, a printed form for which is provided, within one month after his receipt of the party-wall notice from the building owner, or he may do the works himself. If he give a notice, it must be done in the same way as laid down for the notice by the building owner, and if a difference arises thereon it must be dealt with by the surveyors. Sections 89, 90, and 93 give the mode of arranging the payments by the adjoining owner for works done on his requisition. He may demand from the building owner security for costs and compensation before the work is commenced, and the amount of the security is to be fixed by the judge of the county court in case of difference. By Section 92, the building owner is to stand possessed of the sole property in party structure until any contribution which may be due from the adjoining owner in respect of it is paid. This may seriously hamper the adjoining owner in dealing with his property, and may induce him to pay. The party wall, considered as a "dangerous structure," very frequently comes under the notice of the district surveyor. Its connection with the external walls is, indeed, peculiarly liable to cause danger to a building. A case is now under my notice where the front walls of a whole terrace of three-story houses, some fifty years old, have to be taken down and rebuilt, mainly owing to the party walls having been first erected and the front walls afterwards built up against them, without any bond whatever. I know of a case in which this process was reversed. A long façade was first erected, and afterwards the party walls were built against it at such distances as suited the wishes of the purchasers, good bond being of course impossible. New fronts have constantly been added to buildings with very slight possibility of getting good bond to the ends of the party walls, and even in the

building of new premises great difficulty is experienced in making the façades of two adjoining houses meet at the centre line of the party wall, and at the same time getting good bond. Nevertheless, this ought to be done, for we very frequently meet with cases where the walls at this spot are cracked from top to bottom, and are very far from being safe. In case of rebuilding, where a party wall, being exposed, is found to be unsound, it is the duty of the surveyors duly appointed to determine on the steps necessary to be taken in respect of it, and they ought to keep the responsibility from all other parties. Very frequently, where work is being done irregularly, the building owner gives the adjoining owner notice that he will not be responsible for anything that may happen to the adjoining premises; but at least he must have some responsibility for the party wall of which he is joint owner. If neither party will support it, it may result in accident before the attention of the district surveyor is called to it. On the other hand, a building owner who has neglected to give the proper notice in good time, and desires to rebuild a party wall without waiting for the period of three months, is often anxious to get the wall condemned as a dangerous structure, which would operate unfairly to the adjoining owner. One who desires to build a new wall, and to make his neighbour pay half the cost, although the existing wall may be quite good enough for the latter, will also try to obtain the condemnation of the wall, often on very slight grounds. I have now touched upon every part of the Metropolitan Building Act which relates to party walls, except only certain matters of procedure, which are rather in the department of lawyers than in ours. Nevertheless, these portions may be very usefully studied, and the opinion of an experienced lawyer on any difficult case will usually throw great light on any part of the Act. My object has been to arrange the matter in a form to be easily understood, to point out those misapprehensions which seem most prevalent, and to notice some of the cases of difficulty which we meet with in practice. I shall feel glad if those members who have had most experience in these matters will give us the advantage of it, and particularly if they will point out any matters which seem to have been insufficiently noticed, or which require to be corrected; and I trust that the result will be useful to the members of this association.

The PRESIDENT, in inviting discussion, remarked that Mr. Blashill had treated a practical subject in a very clear and lucid manner, and had touched upon several points which had probably escaped general notice.

Mr. ROBERT WALKER feared there was considerable want of knowledge, even amongst metropolitan practitioners, with regard to party walls. In a case in which he was called in, a boiler was built close up to a party wall, and to gain more room the wall was cut into, an arch turned, and part of the boiler fixed in the cavity. When the adjoining owner was reminded of the danger, he replied, "It's only a party wall." Some time since a jury of his countrymen took upon themselves to censure him for allowing what he had no power to prevent, and since then he had condemned some 200 party walls in the district for which he had the honour to be district surveyor. His theory was, that the clause in the Metropolitan Building Act which says that buildings shall be enclosed by walls of a certain thickness makes it compulsory that the building shall have a wall on all four sides, and the next section of the Act seemed to carry out that idea. In this he differed from Mr. Blashill, who thought that an easement could be gained by an adjoining owner in an external wall. Many people, even members of the profession, entertained very erroneous ideas as to the extent of ownership in a party wall and what might be done to it. It was often supposed that a man might deal with the wall as he pleased, and even cut it to pieces so long as he kept on his own side. The respective rights were, in fact, analogous to those of the joint owners of an elephant, one of whom proposed to shoot "his half," but was prevented on the ground that he only possessed an undivided moiety. The Act prohibited a man from even cutting into the chimney breast of the wall. An anomaly in the Act was, that it gave the architect power to do certain work, but no con-

trol over it. The whole responsibility rested with the surveyors called in on either side, and the umpire they selected. As Mr. Blashill had pointed out, if the adjoining owner were cross-grained, he might decline to appoint a surveyor, and the building owner was at a dead-lock. The best course then was either to get a mandamus, or—and this was an alternative he had not yet been able to induce a client to adopt—to make an *ex-parte* application to a judge at chambers. As a district surveyor, if he found the adjoining owner would not move in the matter, he should bring the case before the Metropolitan Board of Works, and so hold him responsible. It was essential in modern building in the City, in which the front and back were often little better than iron and glass structures—especially if, as was often the case, there was an underground railway near by, and sewerage works were going on in the street—that the party wall should be solidly constructed, for it was the backbone of the building. He believed one result of the paper would be to define the law as to party walls, and thus save a great amount of vexation and litigation, and he would propose a vote of thanks to Mr. Blashill.

Mr. GILBERT REDGRAVE called attention to the clear manner in which Mr. Blashill had shown that the third surveyor was not an umpire, as Mr. Walker had said, but could only act conjointly with the two surveyors by whom he was called in, and that the award must be that of two of the surveyors. [Mr. Walker explained that he had only used the word "umpire" in a colloquial sense: all three must act together.] One of the great difficulties of the question was as to the point at which the party wall joined the front wall—where the former stopped in the case of the struts and other ornamental features. He did not know of any decision on the point. In a case of rebuilding where the building owner purposed going to a much greater height than the original structure, and the adjoining owner wished his property to remain unaltered, the party wall must be thickened, and that at the expense of the building owner's land, for the central line of demarcation was shifted to his disadvantage.

Mr. J. D. MATHEWS remarked that every party wall had its own peculiarities, and thus a great number of questions arose which could only be dealt with as they occurred. The Building Act, however, laid down clear general rules for guidance. The raising and altering of party walls was often complicated by claims as to damage to light-easements. A case of the kind was instanced to show the practical difficulty of equitably adjusting these points. Another matter in which a great deal of trouble arose was that in which the Building Act empowered the building owner to do certain work, but not in such a way as to inconvenience adjoining owners. This provision caused great difficulty in building operations in the City, where there might be five or six owners to as many floors, some of whom must necessarily be inconvenienced. Still, it was an open door for litigation, and it would be satisfactory to know what the building owner could do in the matter, and when. Another point not yet touched upon was that of compensation to adjoining owners for inconvenience. The Act did not allow anything, and as several attempts had been made to obtain an award of damages the question was likely to be submitted before long to the law courts for settlement. He trusted it would not be decided against the building owner, for it would prove a very serious impediment to reconstructions. The removal of chimneys was often a very important matter in party-wall alterations. In old buildings blocks of chimneys were often found projecting several feet and resting upon trimmers, and the greatest care was needed to ascertain their relation to one another and to the party wall. He had been engaged in a rebuilding where heavy masses of chimney were set one on either side of timbers through a party-wall, so that in taking down the one block it became necessary to estimate the weight and tie down the beam, so as to counterbalance the weight of the other chimney.

Mr. S. F. CLARKSON considered that so long as the building owner did not affect the adjoining owner's rights in a party wall in the stability of the division, or in his convenience, a considerable amount of work might be done

to the wall, and the Act might, indeed, be strained to a certain extent—say, to the removal of a few bricks, or other reasonable alterations. There was considerable uncertainty as to party-fence walls, and at some future day a court of law might be expected to be asked to define the relative rights and duties in these structures. The Metropolitan Building Act was, as Mr. Mathews said, in the main a good and useful measure. The rights secured to adjoining owners were a mitigated boon, and he believed it would be an admirable thing if its provisions were rendered applicable to the country generally. Notably were its provisions needed for semi-detached villas just without large towns. A general Building Act should not only contain clauses for general stability and protection from fire, but should also prescribe the rights of neighbours in party walls. Further building legislation was about to come into force in London, the Metropolitan Board of Works having under consideration a new code of bye-laws. This would need to be closely watched, for it appeared by an unfortunate wording to sanction the use of inferior bricks for party and the other internal walls.

Mr. HUNTER asked if there was any power in the Building Act to enforce the building owner to carry out the works at the expiration of the three months' notices to the adjoining owners? No allusion had been made as to the state of the law on the formation of openings in a party wall above the level of adjoining premises. If a wash-house or shed adjoined a lofty warehouse, was it inadmissible to open a window in the wall between the two? It seemed that a party wall must be erected between the two, and yet that a window with sills only 18 in. above the parapet might be opened in the warehouse. He thought it would be very difficult for Mr. Blashill to maintain his reading of the Act on this point. Under the Building Act a party wall was not treated from the point of ownership but of separation.

The vote of thanks having been accorded to the lecturer by acclamation Mr. BLASHILL replied to the various points raised. As to the termination of a party wall, he considered that it came to front and back faces of walls, so as to completely separate the two buildings. The question of the true centre line of a party wall was full of difficulties, and should be settled in the courts. As had been pointed out, the wall was often in different thicknesses at the several floors, and those again were held as separate occupations. Adjoining owners had no power to compel action being taken at the expiration of three months' notices; they could be, and often were, renewed again and again. He was concerned in a case in point, in which he had been compelled by circumstances to repeat the notices for seven years, and the adjoining owner had twice died during the interval, and the proposed works were not even now begun.

CAST-IRON PIPES.*

TO all engaged in the design, management, or laying of cast-iron pipes, a small and unpretending brochure, by Mr. Ernest Benedict, C.E., will be found a useful and practical guide. The little book before us is the result of experience in the inspection and testing of pipes which the author has acquired in that capacity. As a rule, we may safely assert that few civil engineers or surveyors have had any but a very superficial acquaintance with cast-iron pipes, the examination and testing of which are generally left to the foreman of works or to the founder himself. Under the head of "Design" some useful hints are given which will be found of especial value to town surveyors and others. As regards the length of pipes they vary from 9 ft. long up to 12 in diameter to 12 ft. long, when of greater size. The author observes, the shorter the pipe the stronger it is, for the joints operate as bands, and he also points out the importance of making sockets strong enough to resist the caulking process required in spigot and faucet pipes. Turned and bored pipes have been used up to 48 in. diameter, and the trench made to receive them is not required to be cut much

* Cast-iron Pipes. By ERNEST BENEDICT, C.E. London: E. and F. N. Spon, Charing-cross.

wider than the pipes; but in laying spigot and faucet pipes the workmen have to get all round the faucet. As regards "collars" for joining spigot ends, the author recommends their being made the depth of three sockets, as they are often used on pipes cut on the spot, and they should be wider than the faucets. Lead joints are advised to be $\frac{1}{4}$ in. thick. The difficulty of testing the thickness of bent pipes makes it necessary they should be cast thicker than straight pipes to ensure a minimum strength. In speaking of connections between service pipes and mains, the author says, the "pap, button, or projection cast on the pipe is the worst, and if a pap is used it should form part of the faucet, for if placed in the middle of pipe it will be a source of weakness to the casting, as any sudden thickening on a straight pipe is apt to draw the metal all round it by reason of the unequal cooling. A ring or band of metal is better. It strengthens the pipe, and no matter what side of the pipe be uppermost, a connection can be made in any direction." Saddles are considered the best and cheapest mode of connection. The formula for thickness is—

$$T = \frac{PR}{C} + K$$

where T = thickness in inches, C = coefficient or ultimate strength of cast iron in pounds per square inch, divided by factor of safety, P = working pressure in pounds per square inch, R = radius in inches, and K = constant in inches, added to resist sudden shocks. Under "Manufacture" we have some desirable suggestions. For instance, as to cores of different sizes and makes, it is very truly said that they come out in rotation as they went in if dried in the same oven, whereas every size of core requires its own time in the oven. If the core be too much or too little dried it scabs, and weak spots in the pipe will be the result, and these are often overlooked. In casting, it is recommended to cast the pipe's socket downwards, so that the socket may be made of metal cast under pressure. In cold or wet weather pipes should remain longer in the "dipping pan." The coating is composed of oil of naphtha, tar, &c., but it will not adhere properly until both the pipe and pickle are of equal temperature. Thin places may be detected by water standing in the pipe when laid level. The usual deviation in thickness allowed is $\frac{1}{16}$ in., but a pipe having a difference of thickness of more than $\frac{1}{16}$ in. at different places should be rejected if the pressure is great. A pipe with unequal sides is found to be weaker than one of the uniform thickness of the thinner side. In regard to the weights of pipes a margin of from 2 to 5 per cent. is generally allowed between the extremes. The writer says it would be more consistent to vary this margin according to the superficies of the pipe, or, say 40lb. for a 10in. pipe 9ft. long, 50lb. for 10in. pipe 12ft. long, and so on. We cannot omit to give the author's advice upon the tests for pressure. The usual test is twice the working pressure, but we quite agree in the remarks that there is no advantage in testing a pipe which it is intended to use afterwards to too high a pressure, for the metal is apt to become strained, and therefore weakened by the process. The best test, says Mr. Benedict, "is to burst a pipe occasionally in the machine—that is to say, go on adding to the pressure until the pipe gives way. This will give a good idea of the ultimate strength of your pipes."

A BUFFET CEILING IN ENAMELLED IRON.

WE have this week seen a very novel kind of ceiling decoration which the well-known firm of art decorators, Messrs. W. B. Simpson and Sons, of St. Martin's-lane, have introduced in the new buffet at the Grosvenor Gallery, Bond-street. The peculiar feature of the ceiling is that it is made of enamelled iron in plates of the size of the panels, and that it presents a clean washable material, well able to resist the deteriorating agencies of smoke, vapour, or gas, while its surface may be decorated or painted in any style of art. The ceiling at Grosvenor Gallery covers a long apartment or buffet, and is divided into panels by longitudinal and transverse beams, the centre

panels being the largest. Each of these divisions are subdivided into smaller panels by white painted moulded ribs of smaller section, with gilded members, and within these are the painted enamelled plates with a highly-vitrified surface. The design is Renaissance in character, and is executed in blue and cream colours, the centre panel figures being relieved on a deep ground of blue with a less depth of tone for the marginal panels. The main beams have a bold fret, and are gilded, and the general tone and effect are highly pleasing and appropriate for a buffet. We understand that the colours are vitrifiable as in china painting, and will resist the action of smoky and other detrimental agencies. The plates are light, can be produced to all ordinary sizes, up to about 8ft. in length, and they can be fixed to ordinary joists or to boarded or concrete ceilings. The side walls of the buffet are divided by pilasters formed of majolica tiles of a cream colour, set in white and gold margins, the compartments between having painted tile borders of a dark sage-green pattern, within which the panels are of plain cream-coloured enamelled tiles. Each compartment is surmounted by a semi-circular panel, in which is an emblematic figure-subject in painted tiles, and the general effect is in keeping with the ceiling. In combination with the tiles we think the enamelled iron decoration of Messrs. Simpson is admirably adapted for restaurants, halls, and galleries, and in every situation where a durable and easily-cleaned kind of decoration is required, and we can recommend it to the profession.

THE GRAND HOTEL, CHARING-CROSS.

WE have in a previous notice referred generally to the architectural features of this important building, and we now take the opportunity of the occasion of a visit to the building last Saturday by the Architectural Association to give a more detailed description of the structure. As our readers are aware, the block of building occupies a very conspicuous frontage towards the Strand and Northumberland-avenue, besides a return down Northumberland-street, and the whole extent of frontage all round is something near 420ft. The two main portions of this frontage are joined by a circular curve of 60ft. radius, and the angle being rather acute between the main fronts, the architects, Messrs. Francis and Saunders, had to exercise some skill in distributing their departments. From a glance at the plans, we are enabled to say much ingenuity has been shown in the economy of the arrangements, the architects having utilised the central area, usually a court-yard in Continental hotels, by a grand saloon or *salle-à-manger*, 96ft. by 50ft. The ground floor, in fact, forms a quadrangle, with the exception of the wing on the Northumberland-avenue side, and its two main fronts have a series of shops, 13 in all, those in the rounded corner radiating in the lines of their division walls below, which are basements, and vaults beneath the pavement. The side towards Northumberland-avenue is devoted to the buffet, which extends about 80ft. from the entrance angle, and is 20ft. wide, above which are the kitchen department and the bath-rooms and closets. The grill-room is in the basement below the buffet. The south wing contains a goods' entrance and staircase, fronting the avenue, a serving-room, and a secondary *salle-à-manger*, while at the south-west angle is the smoking-room and entrance-hall, facing Northumberland-avenue. The hall and inner lobby entrance to the centre saloon with the grand staircase abutting on the west of it, are cleverly planned, so as to obtain rectangularity in the disposition of the marble columns which will adorn this portion, and the secondary *salle-à-manger*, serving-room, and buffet are in convenient proximity. The grand saloon is surrounded by a corridor divided by a range of stanchions, which will ultimately be cased with marble or scagliola to represent Corinthian columns, its central avenue having an arched iron roof of elliptic form, occupying the lower part of the light court in the centre of the blocks above. These stanchions carry, in fact, the back-walls of the building on the upper floors. Ascending by the grand staircase or the passenger lift on

the Avenue side, we reach a spacious landing adorned with detached marble Corinthian columns, which communicates with a surrounding corridor, about 7ft. wide, traversing three sides of the building, and giving access to a suite of bedrooms and sitting-rooms. In the Strand block there are six bedrooms, lighted from centre area, each about 15ft. by 13ft., and 7 sitting and bedrooms in front. The south wing is similarly divided, also the curved frontage towards the Avenue; while on the east side, over the buffet, are a spacious kitchen, with lifts in communication with the larder and bakery departments above, closets and bathrooms for ladies and gentlemen, and two additional staircases. The second and third floor plans repeat this general arrangement, the sitting-rooms and bedrooms being occasionally arranged *en suite*. The passenger lift, about 8ft. square, will communicate from sub-basement to the uppermost floor, and, we understand, will be supplied by the firm of R. Waygood and Co., of Great Dover-street. It is intended to work it by gas power, 2 engines being provided. Altogether there are about 250 bed and sitting-rooms in the five floors above the ground story. A ladies' drawing-room and a library are provided on the avenue side above the smoking-room. The kitchen department is built with fire-proof floors on the well known and well-tried Dennett system. We may add that the basement is devoted entirely to cellars and vaults below the pavements, and these and the shops over will form a large source of revenue. Each shop has its own staircase to the basement, in which is a sink and w.c., and the vaults are lighted by Hyatt's patent lens lights in the pavement in front of every shop. Under smoking-room is a billiard-room. A few details of construction demand notice, and first we may explain the grand staircase, occupying a space of about 25ft. by 19ft. This will be fireproof, being constructed with a concrete core to each step, encased with marble, and we hear that to the clerk of works the principle adopted is due. The principle which has been approved by the architect consists of supporting each step on a rolled flanged joist tailed into the wall. Through these joists are slots for hoop iron to pass through, and the concrete is filled in to encase the iron joists and bars. The steps will have Sicilian marble treads and risers, and the soffit is to be panelled in Parian cement, a trefoil moulding being run on the outer edge. The stairs will be lighted above by a dome light on roof. The Dennett flooring is being constructed for the ground and first floors and kitchen department, Messrs. Bennett having supplied the iron girders. The other floors have 11in. by 3in. joists, pugged between. Ventilating flues are provided in the walls of smoking-room, and the main transverse division walls between the apartments are 18in. and 1ft. 11in. thick, the latter where flues occur. The outside brick walls, exclusive of stone facing, are from 1ft. 11in. to 2ft. 5in. thick, and the building is six stories high. We may mention there is a fall of about 6ft. in the ground from east to west. Iron flanged stanchions, filled up with brick in cement, carry the piers of the main façade. These will be cased in marble slabs between the shops, forming a series of pilasters. The grand saloon we hear is intended to be encased in marble or scagliola, and also the entrance and staircase, but nothing definite has been agreed upon yet. The stone of the main façades above the ground story is of Box-ground, supplied by Messrs. Picton and Sons, and is of excellent quality. We understand Portland has been used up to the ground story cornice. We may add that the elevations of the façade are now considerably advanced, and will be crowned by a Mansard roof and three lofty pavilion roofs. The open light court above *salle-à-manger* is lined with white glazed bricks of excellent quality, supplied by Messrs. Cliff and Sons, also the arches to windows; and the walls generally are built in lias cement, supplied by Messrs. Nelson and Co., the backing to stonework being built in Portland cement. Mr. G. H. Holloway has acted as clerk of works under the architects. Mr. Coates is general foreman, and Mr. J. Woodward foreman of masons under the contractors, Messrs. Merrit and Ashby, of London-wall. The contract is, we believe, about £100,000, exclusive of art decorations.

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ILLUSTRATIONS.

DESIGN FOR A TOWN HALL—ST. MICHAEL AND ALL ANGELS,
TURNHAM-GREEN—"BUILDING NEWS" CLUB DESIGN
FOR SEMI-DETACHED VILLAS—SEDBERGH SCHOOL—NEW
HOUSE AT PUTNEY-HEATH.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ROYAL ACADEMY TRAVELLING STUDENTSHIP
DESIGN FOR TOWN HALL.

We have already published* the prize design in this competition, and we publish to-day the principal elevation and plans of the design submitted by Mr. R. W. Gibson, which certainly ran the one selected very hard in the race. Our readers may now compare the two designs—each of which will furnish much that is suggestive. The author has endeavoured to obtain a monumental character, constructionally truthful and undisguised. Classic forms are freely but appropriately adapted in the details, while the use of such anomalies as attached or superimposed orders, or two-storied pilasters, is carefully avoided. The site was described as fronting a public square or garden: the building would therefore be viewed from considerable distances. The plans provide the accommodation on basement, ground, and first-floors, as required. No mention being made of other stories, the author supposed the design was limited to these. The assembly-room is placed in the centre of the site, surrounded by a wide corridor connecting the various departments. These, although not altogether under different roofs, are so arranged that each is distinct and separable from the others. Yards are provided at the back for prison vans, fire-escape, &c. As we before remarked, the limited time in which these designs have to be prepared does not allow of very mature deliberation or study.

"BUILDING NEWS" DESIGNING CLUB.
SEMI-DETACHED VILLAS.

PROBABLY one of the most difficult problems which an architect has to solve in every day practice is to design an inexpensive and appropriately treated pair of semi-detached villas, which shall comprise ample apartments and accommodation, with compactness of plan, and so designed to be suitable for erection on a series of plots of limited frontage. That suburban villas as a rule are among the most vulgar and badly contrived buildings to be met with is amply proved by those seen in the suburbs of every large town in the three kingdoms, and with the idea of helping forward the few efforts which have already been made to improve matters in this respect we chose the subject of a pair of villas, such as are constantly required as a subject for the members of the BUILDING NEWS Designing Club. To-day we publish the design which we have selected from about 30 plans sent us; and, although we cannot deny that there are several parts, chiefly in the hall, staircase, and kitchen, which might be considerably improved upon, as we pointed out when reviewing the series, yet as a whole the plan offers much that is worthy of imitation; while the architectural treatment is suitable and good. The difficulty of overlooking has been provided against but partially, as the window and door of the sculleries would immediately overlook those of the adjoining houses, which is an objection.

* BUILDING NEWS, Jan. 3rd, 1879.

NEW HOUSE, PUTNEY-HEATH.

THE building which we illustrate this week is erected on the site of one of the old Government semaphores, which, before the invention of the telegraph, connected Portsmouth Dockyard with the Admiralty at Whitehall, and, weather permitting, signalled a short message in about 20 minutes. The new house being placed on such an elevated spot commands extensive views, and harmonises extremely well with the landscape. The rich full red tone of the walls and the Broseley tiles of roof, relieved with stone, look extremely picturesque on the wide expanse of heath. The ground plan which we give shows the general arrangement of rooms, all of which are well proportioned, the woodwork of drawing-room being Spanish mahogany, the drawing-room decorated in colour, and the remainder of floor and staircase finished in wainscot. The basement, which is kept above the garden level, is lofty, and provides a spacious billiard-room and school-room, with kitchen and numerous offices. On the upper floors there are ten bedrooms, with dressing and bath rooms, &c. The whole of the works have been carried out by Mr. Robert Avis, of Putney; Mr. Theodore K. Green, of Finsbury-place, being the architect.

SEDBERGH SCHOOL.

THE ancient Grammar School of Sedbergh has, like many others in the country, lately come under the Endowed School Commissioners. A new "scheme" has been drawn up, and under the guidance of a large and influential board of governors new life is being infused into the old school. A head-master's boarding-house for 40 boys was completed last autumn, and a second boarding-house for the same number of boys will be finished next autumn. The illustration gives a view of the proposed "central block," containing various class-rooms, physical science rooms and laboratory, drawing-room, governor's and master's rooms, large hall for assembly, chapel, &c., and, when completed, will form a conspicuous group of buildings occupying a commanding site to the west of the town. At present only the group of class-rooms are being built. The stone for the buildings is procured from quarries near Shap. The roofs are covered with green Westmoreland slates. Messrs. Paley and Austin, of Lancaster, are the architects.

CHURCH OF ST. MICHAEL AND ALL ANGELS,
BEDFORD—ARK ESTATE, W.

DURING the last fortnight we have published the geometrical drawings, with details, of this new building, and to-day we complete the series by giving a perspective view with the general ground plan. Another page is devoted to the longitudinal section and details of the aisle windows with buttresses. The houses and poplars in the Woodstock-road are correctly shown in the view, from a sketch taken on the spot for the purpose. To the west of the church is an open common, bounded on the north by the trees seen in the picture. All the old trees on the estate are left standing, and fresh ones have been thickly planted. Mr. R. Norman Shaw, R.A., is the architect.

ARCHITECTURAL & ARCHAEOLOGICAL
SOCIETIES.

DERBYSHIRE ARCHAEOLOGICAL SOCIETY.—The first annual meeting of the Derbyshire Archaeological and Natural History Society was held at Derby on Monday. The first volume of "Transactions" was issued, the most important part of which is a full report of the society's excavations at Dale Abbey, which will be resumed in the spring. One of the illustrations to this paper is of a stone effigy of 13th century date, found nearly perfect in the chapter-house. Mr. Bloxam pronounces this effigy of a canon to be in many respects absolutely unique. The volume has other interesting papers on Derbyshire archaeology by C. S. Greaves, Q.C., J. Charles Cox, W. H. St. John Hope, W. H. Hart, F.S.A., &c.

LEEDS ARCHITECTURAL ASSOCIATION.—At a meeting of this association held on Thursday week, a paper on "Elizabethan Architecture" was read by Mr. W. H. Thorp. Mr. Thorp described the decline of Gothic architecture in the reign of Henry VIII., and made reference to the characteristics and features of the Per-

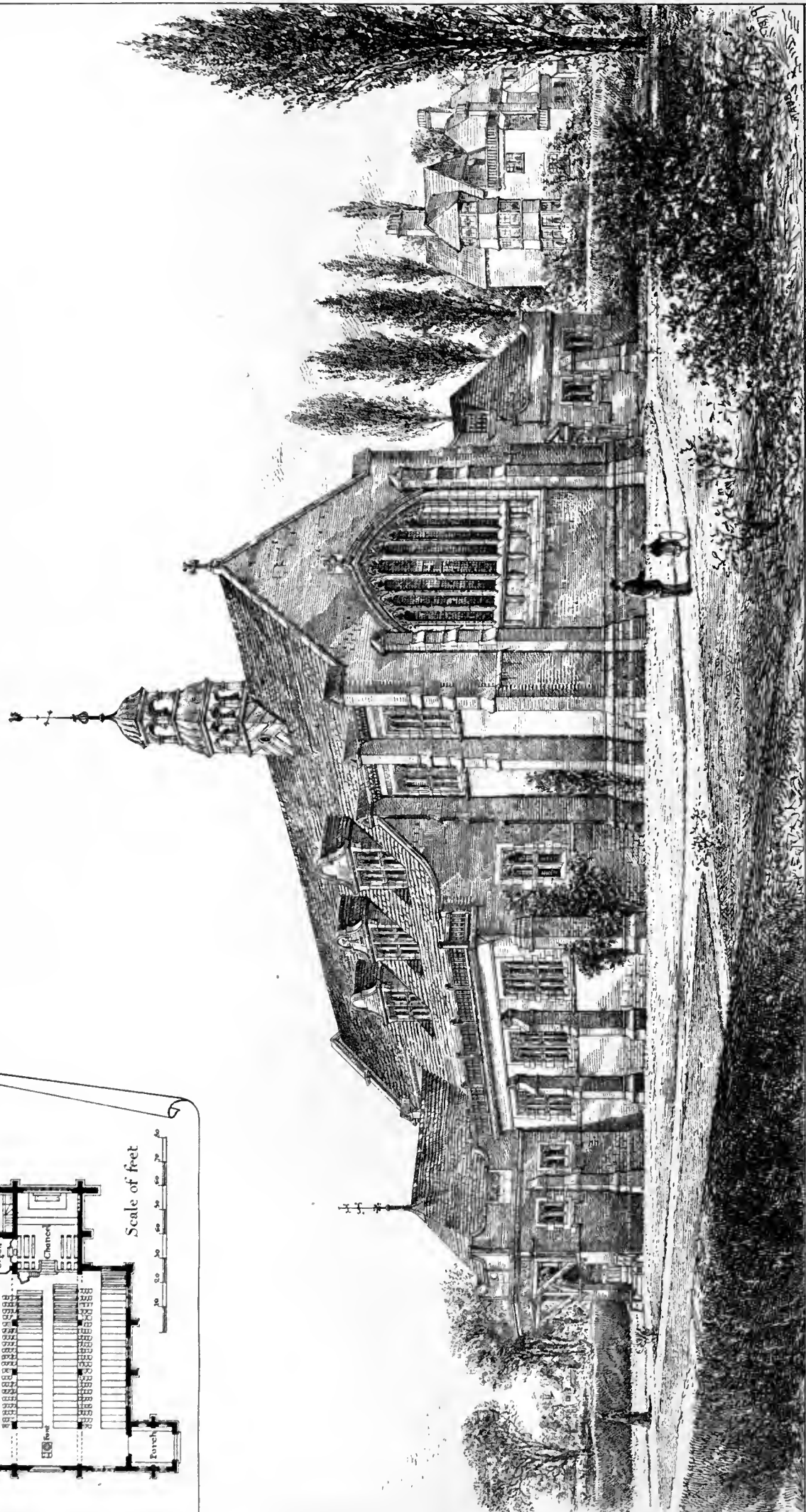
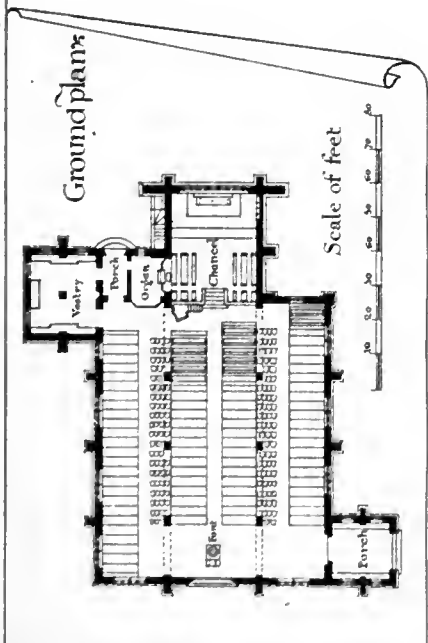
pendicular or Tudor style of architecture in vogue during the earlier years of his reign and that of his immediate ancestors. The introduction of classical architecture in the reign of Elizabeth was treated upon, mention being made of the causes for the change in style, the chief ones being the example set to us by the other countries of Western Europe, who had adopted the classical styles nearly one hundred years previously; and also the teaching of classical literature in our colleges, the arts always following in the train of, and being largely influenced by, the literature of the time. The latter holds equally good now, and in reference to it Mr. Thorp said—The literary works of note now so abundant, dealing with nearly every subject and thing under the sun, accounted to a large degree for the diversity of taste and style in things architectural; the Japanese motifs in design, now so much in vogue, to a large extent owing their existence to books upon the Japanese and Chinese peoples, their buildings, manners, and customs, and the large importations into this country of their goods—such as cabinets, lacquer work, porcelain, silks, and fans. It was stated that very few churches are left to us of the Renaissance period—St. John's Church, in Leeds, being one of the best examples erected in the reign of Charles I., the interior having a grace and beauty, an antique and old-world appearance, and a quiet harmony of colour denied to many other ecclesiastical buildings of greater importance. The examples of secular or domestic work are infinitely more numerous than those of churches—the palatial halls of Longleat, Wollaton, Hardwicke, Haddon, and Holland House, and also some of the colleges of Oxford and Cambridge being described, with mention of their architects. Mr. Thorp, in conclusion, said that he considered Elizabethan architecture had been unjustly condemned, for it was the natural outcome of the age, and was well adapted for the wants and requirements of the sixteenth century.

NORTHERN ARCHITECTURAL ASSOCIATION.—On Thursday, the 23rd inst., a special meeting of the Northern Architectural Association was held in the Old Castle, Newcastle-on-Tyne, for the purpose of presenting a farewell address and a purse of sovereigns to Mr. Robert Lamb, of Darlington, who is about to leave England for New Zealand, on account of his health. The chair was occupied by Mr. Thomas Oliver, president of the association, who also made the presentation. He referred to Mr. Lamb's connection with the association, which was formed just twenty-one years ago, and regretted the cause which led to his removal to a distant clime, although he firmly believed that the qualities which he knew from experience Mr. Lamb to be endowed with were the very qualities suited for a new country. He was sure that every member of the association, in wishing Mr. Lamb farewell, also wished him God-speed. The address, which was very beautifully illuminated and framed, was then presented along with the purse of sovereigns. Mr. Lamb thanked the meeting for the kindness that had been exhibited towards him, and the proceedings then terminated.

SCHOOLS OF ART.

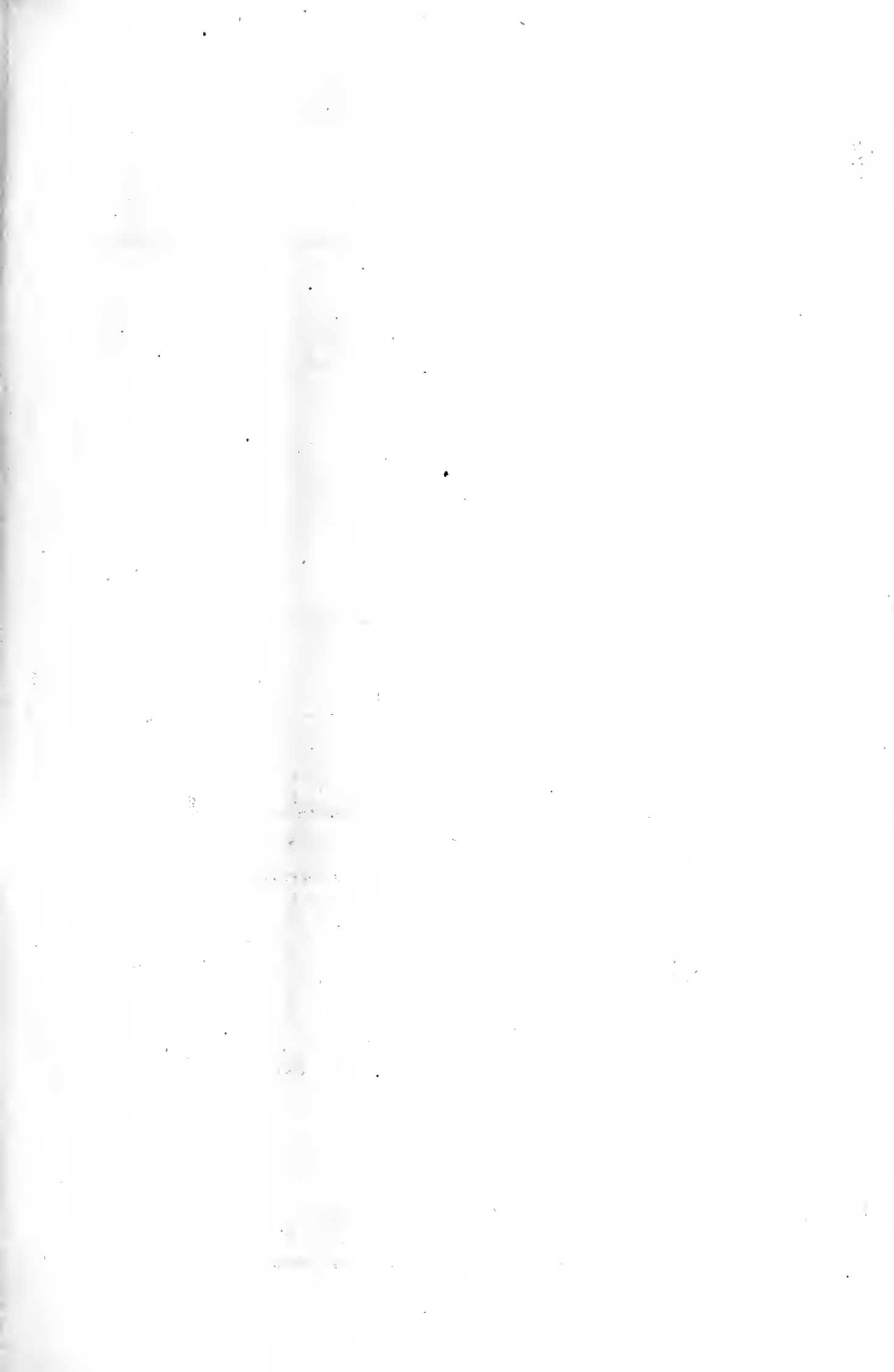
CIRENCESTER.—The annual distribution of prizes took place on Wednesday week. The reports showed that there were now 103 students. At the national competition at South Kensington a Queen's prize and a third-grade prize were gained by students for designs for a ceiling in plaster work. One South Kensington and three local scholarships and five other third-grade prizes had been also awarded to Cirencester by the Department. A number of local prizes had been awarded—Mr. Kemp, head-master of the Gloucester School of Art, being the examiner. After the presentation of prizes and certificates, a vote of thanks was passed to Mr. Miller, the head-master.

The Royal Albert Hall lies in the very heart of aristocratic London. There is not a mean dwelling within half a mile of it, and that is the especial reason why her Majesty's commissioners, who have turned it into a picture gallery, charge only sixpence for admission. The last attempt to utilise the poor colosseum of Kensington Gore will be as big a failure as every other effort to use the royal folly.



Church of St. Michael and All Angels · Bedford Park · TURNHAM · GREEN · S. E. VIEW · R. NORMAN · SHAW · R. A. ARCHT. 78

Photo Engraving & Printed by James Alderman, 6, Queen's Square, W. C.



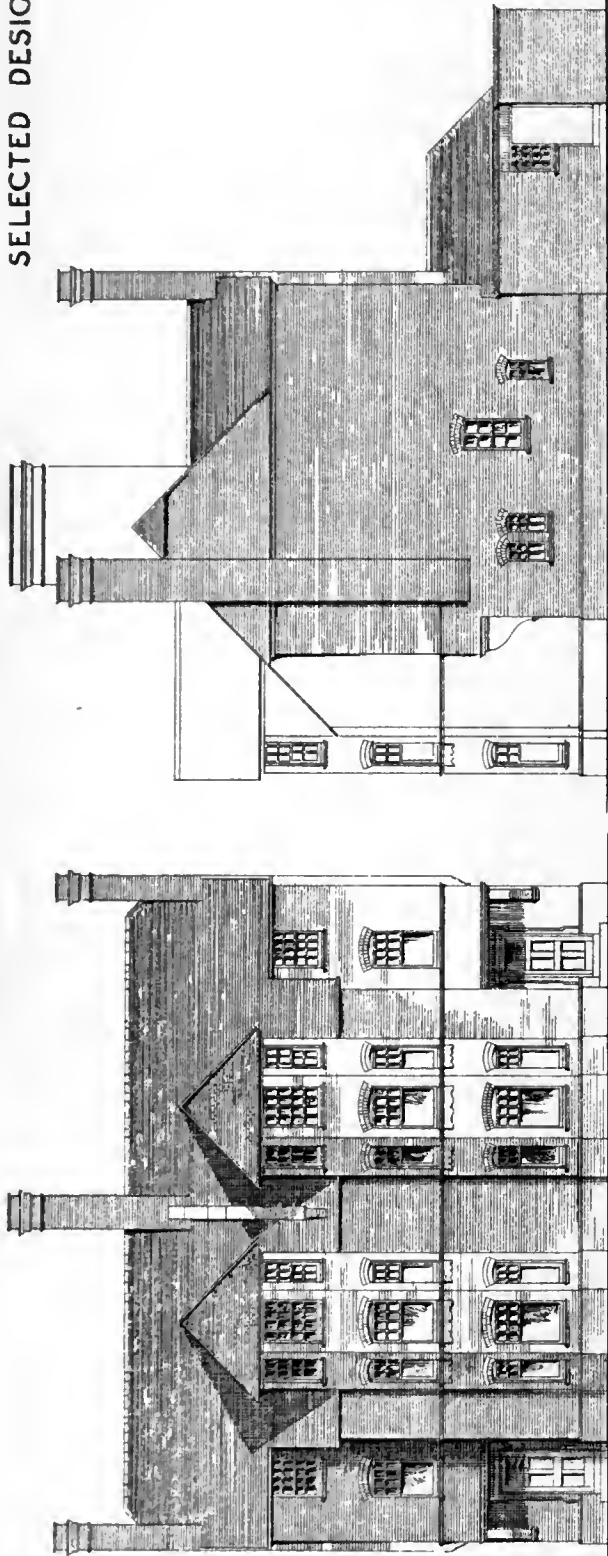
SELECTED DESIGN

Design for Semi-detached Villas.

(Total Contents 6415 feet and space of 15000.

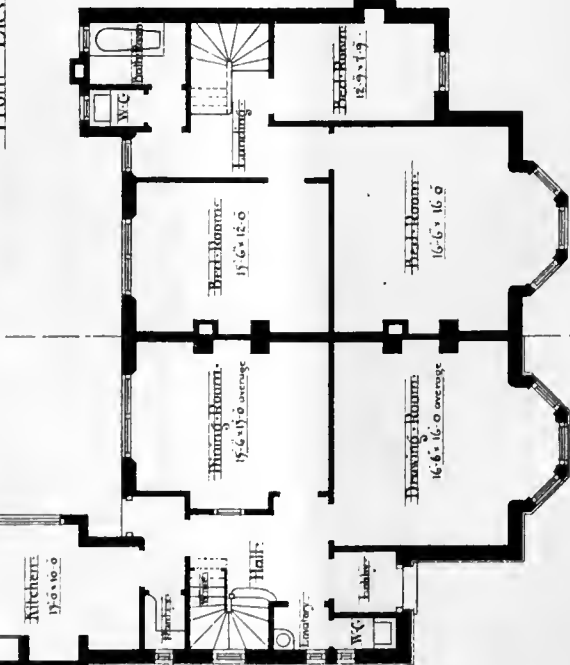
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Scale 1" = 10 feet.



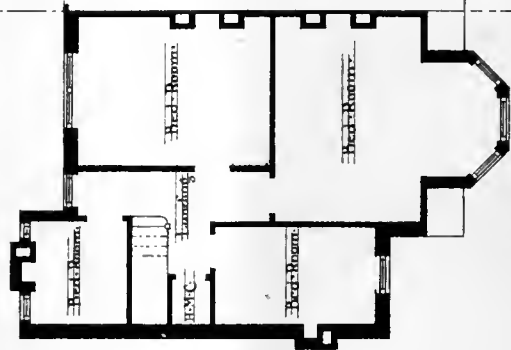
Side Elevation.

Front Elevation.

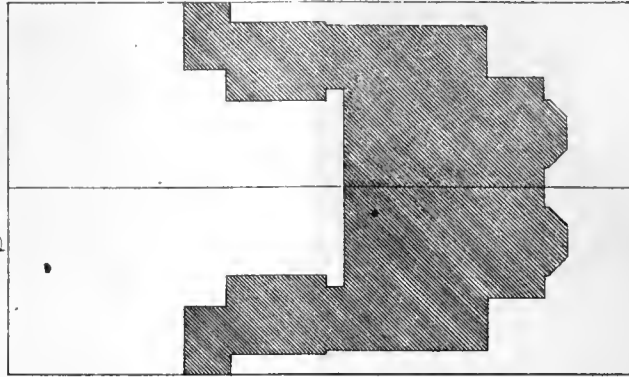


Ground Plan.

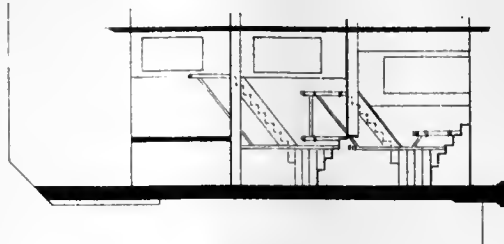
Chamber Plan.



Attic Plan.



Plan of Site.



Section.

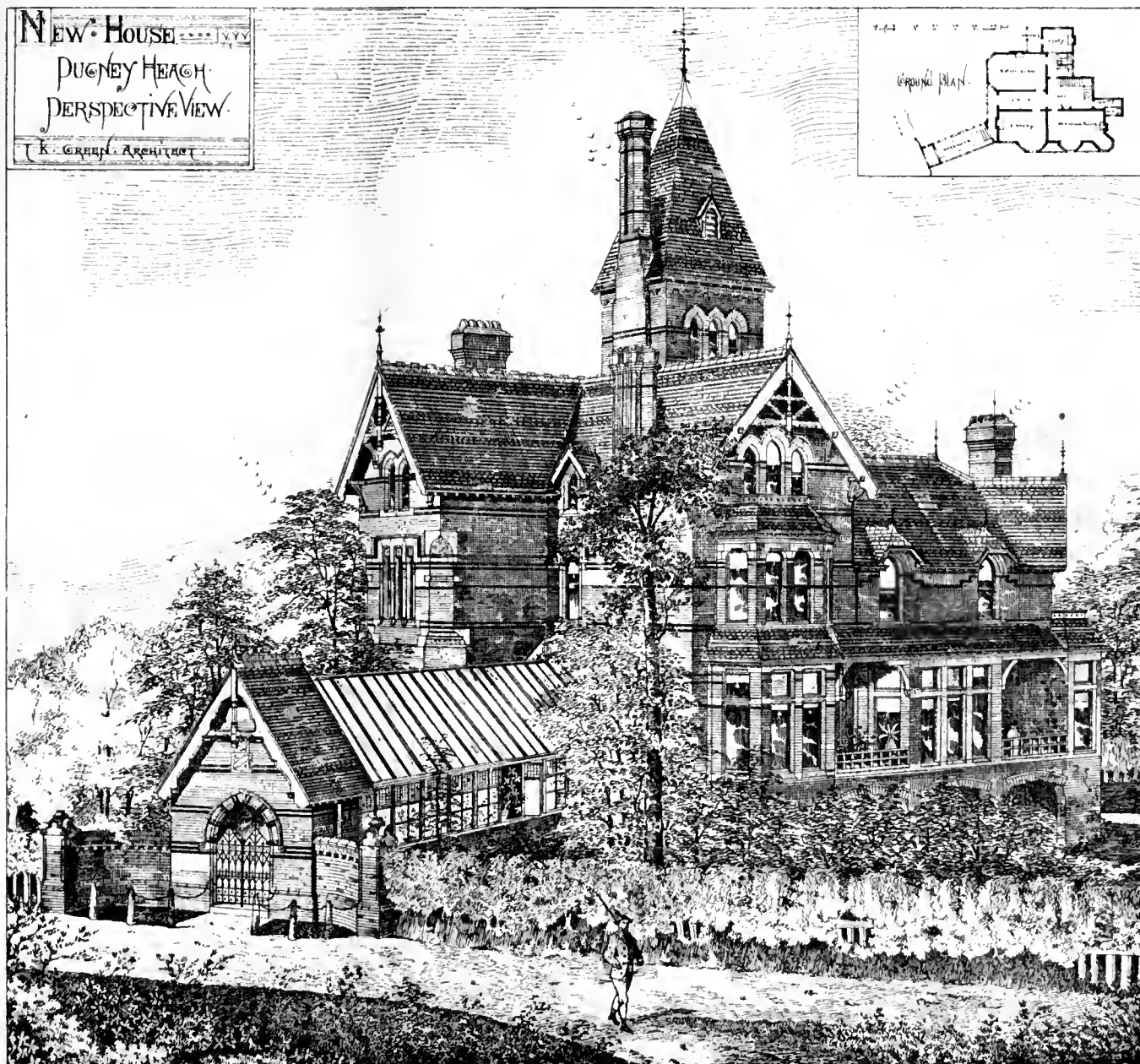
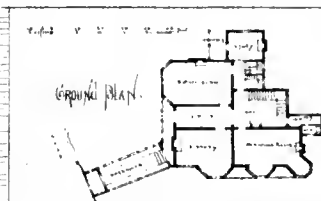
Dec 19, 1878



SEDBERGH SCHOOL.

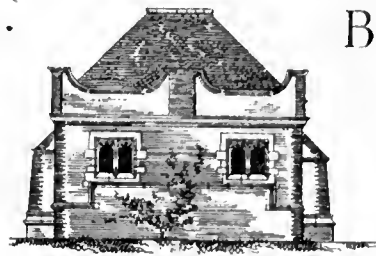
*Salway & Austin, Architects.
Lancaster Feb. 1878.*

NEW HOUSE
PUGNEY HEACH
PERSPECTIVE VIEW.
J. K. GREEN, ARCHT. 1877.



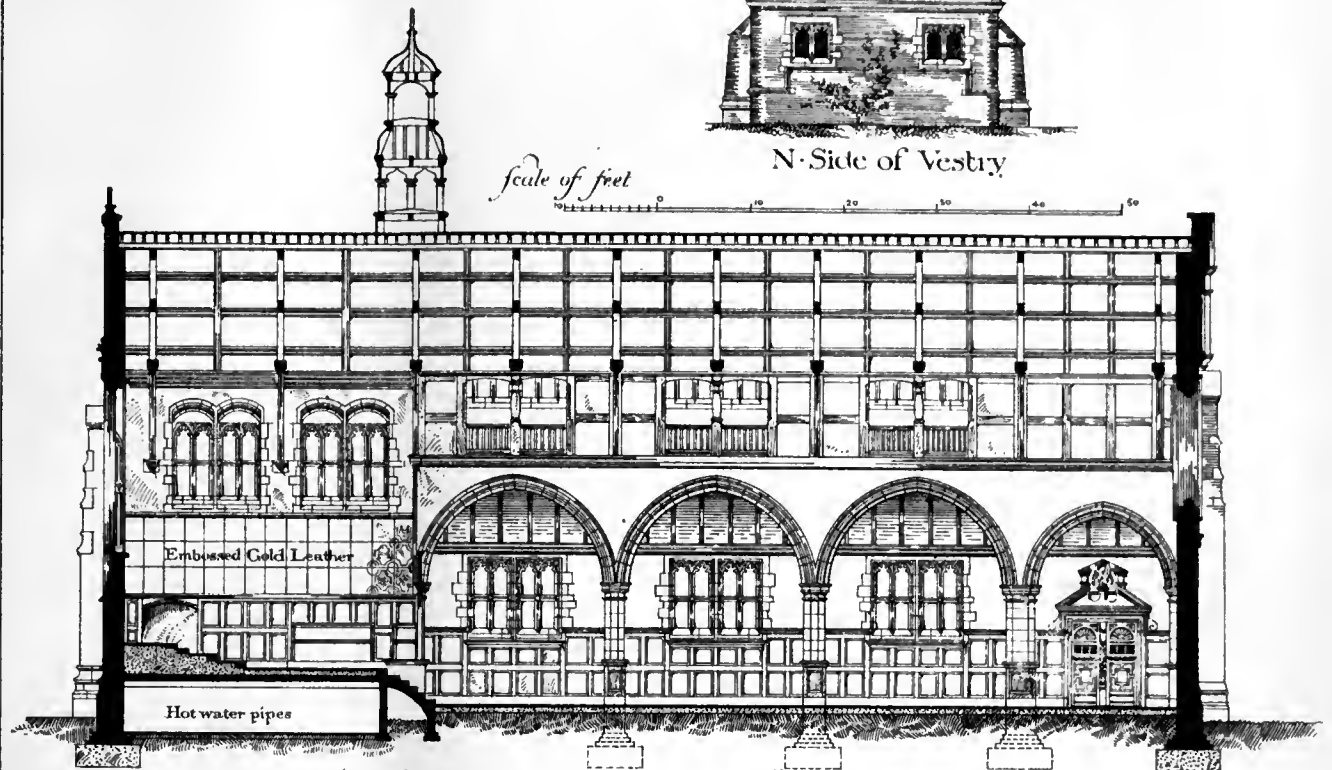
Church of S. Michael & All Angels.
TURNHAM GREEN

Bedford Park

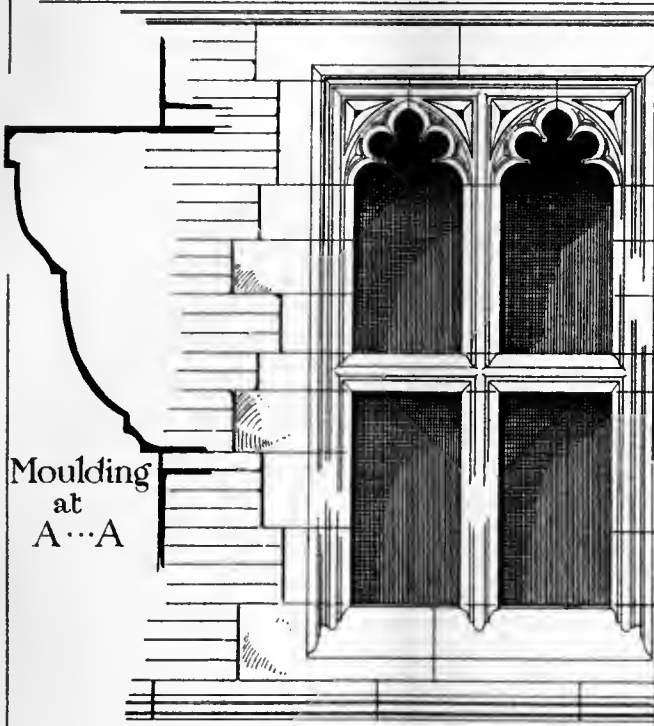


N. Side of Vestry

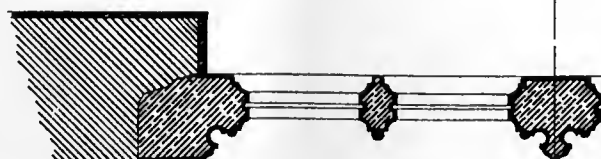
scale of feet



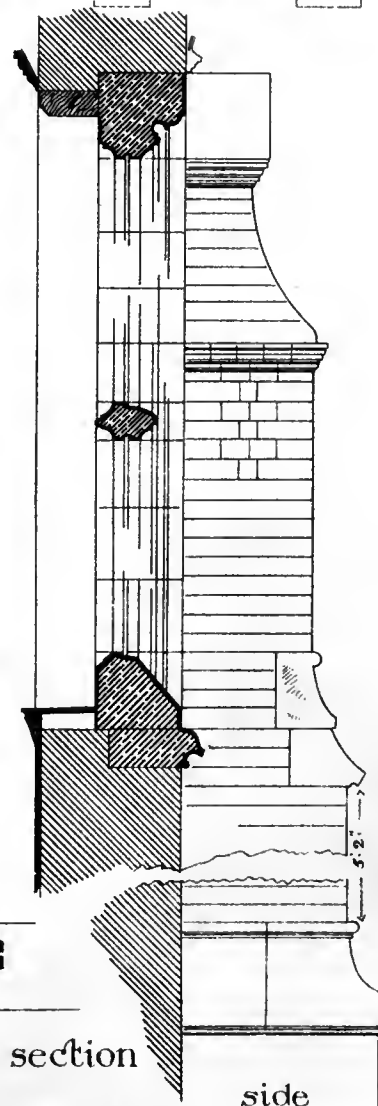
Longitudinal Section



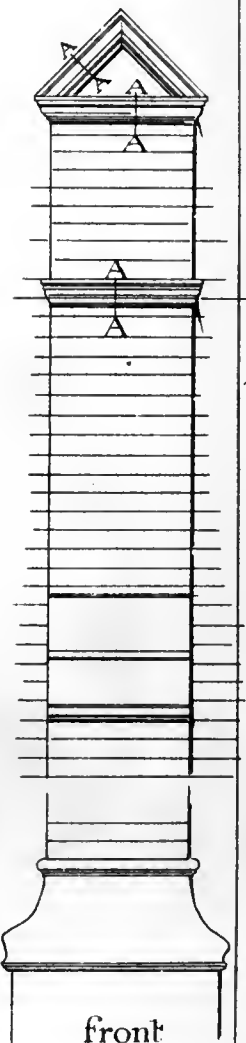
half external elevation



plan



section



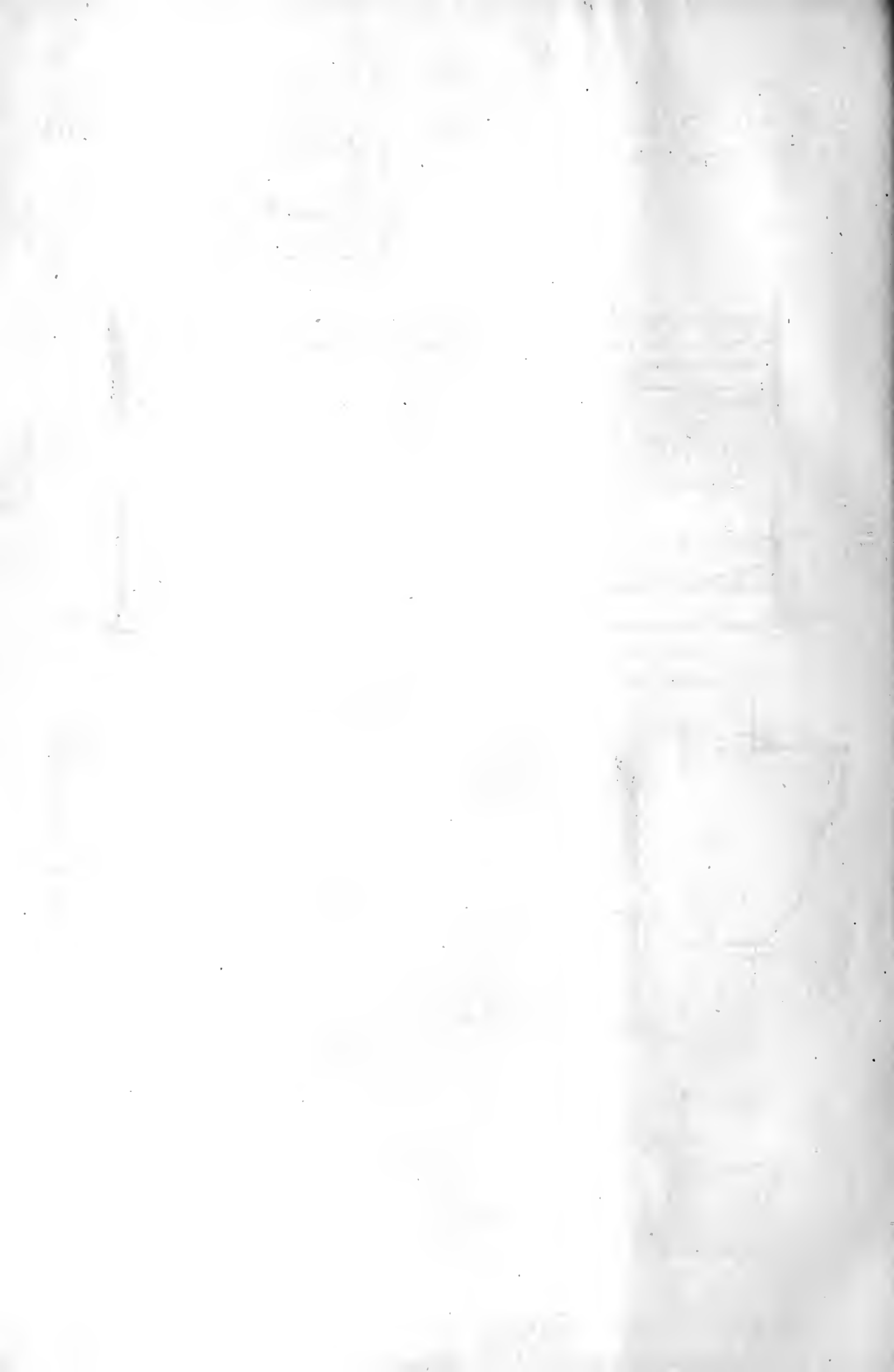
side

front

North & South Aisle Windows and Buttresses

Scale of feet

R. NORMAN SHAW R.A.
ARCHITECT

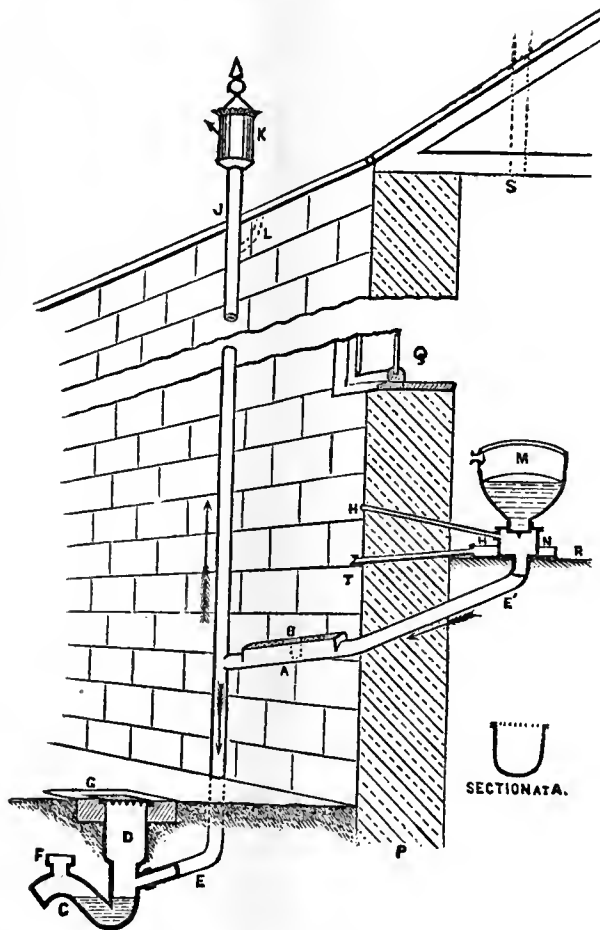


A SCIENTIFIC AND SAFE WATER-CLOSET.

AT page 651 of the *BUILDING NEWS* for November 27th, 1874, you published a letter from me under the above heading, and with a sketch, showing my then ideas of the requirements for the safe fitting up of water-closets. That sketch was open to improvement, and in a few months was developed into my patent of April, 1875, which patent, according to page 408 of Mr. Baldwin Latham's "Sanitary Engineering," is the same system as that afterwards mentioned in the Model Bye-laws of the Local Government Board. It is difficult to arrive at perfection, however, and all the above systems left room for improvement. As another contribution towards that improvement, I beg to show a sketch of a style of fitting up a water-closet, either with or without a lead siphon trap,* which, for combined safety, efficiency, and simplicity, is, I think, in advance of any plan yet published.

The novelty or speciality in it, the open pipe, A, in the sketch, was suggested

the water-closet. This is effected as shown in sketch. C is one of my ventilating drain-traps, but any other suitable one may be used as the plan is not patented, and is freely open to be adopted by any one. D is the fresh-air entrance channel to the trap and soil-pipe, E. This soil-pipe, E, being surmounted by a 4in. ventilator, K, when wished, a constant current of air is expected, and will generally be found to be passing up the soil-pipe. This up current will tend to draw in air from the open channel at A, at the end nearest the soil-pipe; while, if an opening existed in the branch soil-pipe, E', no bad air from the upright soil-pipe would get access to the house, but only through the short portion of branch soil-pipe, about 2ft. long or so, fresh air pouring in from the end of A nearest the water-closet. Again, owing to the ventilating pipe, H, no bad air could gather in the branch soil-pipe. B is a swinging valve, that might be put in if wished of tinned copper, but I consider it unnecessary. M is a Bramah valve-closet, but other closets may be used. N is the lead safe, with safe-pipe, T, carried outside, and with hinged valve at its outlet



to me by a perusal, about eighteen months or so ago, of the article on "Sanitary Science" in Blackie's "Encyclopædia," by Dr. Robert Bell, F.F.P.S., Glasgow. I never, however, worked the idea out thoroughly until last week; but, having once done so, I believe the idea to be not only very good, but easily carried out in practice, and especially in new houses. The intention, in 1874, was to lock off the drain from the soil-pipe and water-closet; but the intention now is to keep out as far as possible any gas that may be bred in even the soil-pipe itself from

end. R is the level of the floor; Q is the water-closet window; S is a ventilating shaft for the water-closet enclosure, which may be surmounted by a ventilator. Only one water-closet is shown leading into the upright soil-pipe, but several may be led into it, as in flatted houses or large private houses, and by carrying each branch soil-pipe, say, 3ft. or so along the wall, and leaving about 2ft. of it open at the top, as shown in section at A of the sketch, then each water-closet is locked off from the soil-pipe, so far as the passage back of sewage gas into it is concerned, without interfering with the free passage outwards of the water and soil. J is the soil-pipe continued upwards above the roof, full diameter; L is a rain-water pipe, which in some cases may, with perfect propriety, be led into it, especially if no windows are near. Its worst effect is to tend to supply the ventilator with air instead of the air being forced to come from lower down. It is only ticked in as a suggestion, however, and people can please themselves.

As above stated, the idea or plan, which can also serve for waste pipes, is not patented and

I shall be glad to hear of its adoption anywhere, and in the meantime will be pleased to hear the opinion of architects, practical sanitarians, or others interested in sanitary progress.

W. P. BUCHAN, Sanitary Engineer.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AN ordinary meeting of the Institute was held on Monday evening; the President, Mr. Charles Barry, in the chair. The following gentlemen were elected to membership:—As Fellows: Henry David Davis, associate, Finsbury-circus, E.C.; and Henry Walker, associate, South-parade, Leeds. As Associates: Charles Grieve, Park-villas, Shepherd's-bush, W.; William Henry Wood, Guildford-street, Russell-square, W.C.; Robert Curwen, jun., South Castle-street, Liverpool; Charles William Brooks, Duke-street, Adelphi, W.C.; and Alfred Hessel Tiltman, Great James-street, Bedford-row, W.C. As Honorary Associates: Richard Fuge Grantham, Assoc. Inst. C.E., Whitehall-place, S.W.; Henry Bessemer, M. Inst. C.E., Denmark-hill, S.E.; and William Robert Wood, Carlisle House, Brighton.

An application from Mr. Augustus Laver, now a naturalised American citizen, residing at San Francisco, to be transferred from the list of fellows to that of hon. and corr. foreign members, was read by the Secretary. The President stated that Mr. Laver was with them that evening, but would leave in the course of five-and-thirty minutes for the United States. He had since 1865 been a fellow, and as it would be desirable to maintain a knowledge of what was going on in America, he should ask permission, in breach of the bye-laws, to propose Mr. Laver's election that evening. This was carried by acclamation, and Mr. Laver was cordially welcomed.

The Secretary announced several donations to the library, including a new architectural work by M. Leueur, entitled "Histoire et Théorie de l'Architecture." Mr. PENROSE said the last-mentioned was a valuable work, but the author had fallen into error in attributing the horizontal curves in Greek architecture to defective foundations.

The President said he had to make a mournful announcement—that of the death of a distinguished Frenchman, M. Joseph Louis Duc, the architect of the Palais de Justice, who only two years ago came over to receive the gold medal of the Institute. Prof. Donaldson had undertaken to draw up a letter of condolence to the widow, and an expression of regret at the loss architecture had sustained. He had further to announce that Mr. Thomas Henry Wyatt had consented to take the late Mr. Cockerell's place as hon. corresponding secretary until the next general election, and that the council had accepted the offer with thanks. At the close of the next meeting a special meeting would be held for the purpose of confirming the temporary appointment.

THE MODERN RESTAURANT.

The President said Mr. Verity's paper was now open for discussion. He regretted that he was unable to form one of the party who visited the Criterion on the previous Monday.

Mr. W. M. TEULON, as one of those who went over the Criterion, wished to express his appreciation of the economy of space observed in its planning and arrangements, and the ingenuity of the heating and ventilating apparatus. The decorations were also good.

No other member rising to continue the discussion, the President suggested that perhaps all the members were so well qualified for practice, that they believed they could each have met the difficulties with which the undertaking abounded in the best possible manner—when the way was pointed out—and that they could have found a remedy for all the defects. Still, there must have been more than one mode of meeting some of the difficulties, and he wished some member had indicated some other method. He was struck with the extreme ingenuity with which so many different elements were combined in one building. He noticed that a kitchen was provided on every floor instead of concentrating the cooking apparatus at the top of the building as was usual; had this complicated arrangement been found to work with-

* I have still a strong fancy for the retention of the siphon trap, and since writing the above I happened to call upon Mr. James Maclear, managing partner of St. Rolox Chemical Works, who is experimenting with water traps. He easily got the gases to pass through the water, but failed in all his attempts to get ferment germs to pass through. He hopes yet to manage the latter, but his failures hitherto show the value of water in keeping back germs and disease-breeders from the house or inner side of a water trap. The molecules of the gases may pass freely through between the molecules of the water, and the more readily in imperfectly ventilated pipes, but the germs, being many times larger, cannot get through in the same way, I consider.

out confusion of service and accounts? They had been told that the building cost 2s. per foot, including all that the architect supplied; had Mr. Verity any objection to state the absolute cost?

Mr. C. FOWLER asked as to the weight per foot super. upon the foundations.

Mr. VERITY replied that it was at first intended to have separate kitchens on each floor, but practically there were but three in use—those in basement, principal floor, and at the top, and those for different purposes; the other rooms were subsidiary, and used for serving. The cost mentioned included the construction and engineering, heating and ventilating, but not that portion of the furnishing undertaken by the proprietors. He had not estimated the weight of building, except that portion supported on stanchions.

NOTES ON ST. PAUL'S CATHEDRAL.

Mr. FRANCIS C. PENROSE, M.A., read the following paper on the cathedral of which he has for many years been the surveyor. The subject matter of the notes was arranged under the following heads:—Firstly, the improvements in the crypt, and intimately connected with these the discovery of important records of Old St. Paul's; secondly, the proposed alterations in the churchyard by agreements between the Dean and Chapter and the Corporation of the City of London; thirdly, the new peal of bells; and fourthly, a statement of the position in which the decoration scheme is at present. For the last seven years or thereabouts, said the author, the dean and chapter have endeavoured to make the crypt both useful for ecclesiastical purposes and more worthy as the burying-place of illustrious public characters and artists than formerly. Until lately only a small part has been shown to the public, and with the exception of the immediate centre, containing the tomb of Lord Nelson, and the contiguous chamber, in which the sarcophagus of the Duke of Wellington is placed, it was dark and uncared for. Much of it was devoted to stowage of materials, a large portion of these being the scaffoldings which were used for the school children's festival, and the remainder serving for various necessary purposes. Now, with the exception of these last, the whole has been formed into a *campo-santo*. The walls have been cleared of the soot of generations, and the floor is being laid down with mosaic tesserae in various colours and of classical design. About 4,000 square feet have already been so treated, 3,000 more are decided on, but not yet executed, and by degrees the rest will follow. The eastern part—viz., the site of the ancient chapel of St. Faith—has been arranged for divine service. Around this part of the crypt have been arranged the remains of certain monumental effigies which were rescued from the old cathedral, and which Dugdale's accurate views, taken before the Fire, enabled us to identify. They have each been mounted on a simple altar tomb with the name inscribed. They record names well known in the 16th century—viz., Hewett, Collayne, Hatton, Heneage, Wolley, Baskerville, and some others. The central nave in the crypt has now been opened for its full length of about 450ft., and the bronze car which conveyed the body of the Duke of Wellington to the cathedral in November, 1852, and which for a number of years occupied a chamber near the centre, and terminated the part shown to the public, has been removed to the extreme west. This central portion of the nave is now divided from the side aisles, to which, with the transepts, the workshops and stores are relegated by wrought-iron railing. It was the opening of the western crypt that led directly to the discovery of the remains of Old St. Paul's. One of the arches contained our huge gas-meter, which entirely blocked it up. It was essential that this should be removed, and a pit was dug for it on the outside to the south of nave, to a depth of about 10ft. from the ground line of the churchyard. Just on the edge of this pit, and about 9ft. from the surface, was found a piece of stonework evidently *in situ*, which had clearly some connection with the old fabric. The mortar was different from that used by Sir Christopher Wren, and from its position it could have nothing to do with his work. There was em-

bedded in it the frustum of a column, apparently Norman, from which it seemed that this piece of foundation belonged to some of the 14th century work, and that the Norman fragment was old material derived from the original choir, or perhaps from St. Faith's Church, demolished in 1256. This find then seemed a relic of old St. Paul's. In my office was a copy of the plan contained amongst the Wren collection in All Souls' Library, Oxford, which represents the new cathedral placed upon the old,* and from this plan I assumed I had hit upon the foundation of one of the piers of the passage leading from the cloister into the chapter-house. Guided by the plan, I sank a pit more to the westwards, to try for one of the buttresses of the chapter-house, but with no result. The earth showed no signs of ever having been disturbed. I then tried backwards towards the east, thinking that I might at last get hold of another part of the cloister. The plan again proved fruitless; but a little more burrowing towards the east revealed a fragment of what I thought might be a buttress of the main transept wall—that is the western wall of the south transept. This was about the same depth below the surface as the first discovered fragment; and the next morning part of the cloister wall, with its buttresses, was found, and the S.E. internal angle soon followed. Two of the great buttresses of the chapter-house rewarded further investigation, but these were all, for the other buttresses of the chapter-house had been entirely rooted up, partly for the requirements of the new structure and partly for the drains. We also found the external S.E. angle of the cloister and part of the street wall, and the internal S.W. angle and some traces of corresponding external angle. The pavement in several places exists, composed of squares and lozenges of Purbeck marble, and is about 14ft. below that of the present cathedral, but very nearly on a level with the street to the south. These remains belong to the lower story of what Sir Christopher Wren has described as "a chapter-house of a more elegant Gothic manner with a cloyster of two stories high." The historians of the cathedral inform us that the chapter-house was begun to be built in 1332; but when we study the detail of the mouldings, which are very small and refined, it is impossible to attribute so early a date. Nevertheless, both Hollar's view and some remains of tracery dug up during the excavations point to a general design which would almost fit in with the period assigned. The probability is that the work is actually of the end of the 14th century, but that an earlier design had, with some modifications, been carried out. The vaulting of the chapter-house, although the building was octagonal, was arranged (in the lower story at any rate) so as to rest upon four central columns. This is shown in all the plans; and the base of the middle vaulting shaft is curiously separated from the others which follow the octagonal arrangement for this purpose. All the chapter-house shafts and bases are of Caen stone, but those of the cloister are of Purbeck marble. All are extremely well cut and elegantly profiled. Fearing the effects of frost upon this newly-opened masonry, I had them twice coated with beeswax dissolved in spirits of turpentine, and thus far they have well resisted the action of the weather, whilst some stones of the same material, which, not being *in situ*, were left to themselves, have been much affected by it. When our discoveries are compared with the Oxford plan, there is found to be an error both southwards and eastwards, amounting to about 10ft. in each direction. In other respects the cloister is accurately blocked out, and the length and breadth are in very close agreement with the dimensions. It is a matter of very great interest to ascertain, if possible, whether the plan must be given up as hopelessly inaccurate to at least the above extent, or whether there may not be an occult reason for the particular error, which does not vitiate the plan altogether. A plan of the existing cathedral from measurements to the same scale as the Oxford

plan, shows that the two agree very well indeed. This is, presumably, in its favour. Then we have to consider what was the object of this particular plan; not the detail of the architecture, which is merely sketched on the plan, but the exhibition of the divergence of the axial lines of the two buildings. There are great peculiarities about this plan, which, unless proved to be carelessness, must have an important meaning. The line which is shown for the west front is very considerably out of square with that which is given as the axis of the cathedral; neither is the axis of the transept square with it. The latter is shown as almost parallel to the west front. The east end, again, is an oblique line. Let us compare this plan with other plans of old St. Paul's. The plan is very nearly to the same scale as that given by Dugdale, engraved by Hollar, but there are some differences which show it to be an independent document. There is also among the All Souls Wren Collection drawings a larger plan on vellum, but it is not itself original, and the following account of its authorship has been given me:—"The plan is on vellum, and Elmes, in his 'Catalogue of Wren's Drawings,' says of it: 'Mr. Gutch tells me that Mr. Buckler copied it for Sir H. Englefield.' " Nevertheless, it seems from the above to have been copied from something else, perhaps from an old plan which was falling to pieces, and it certainly represents the cloister and chapter-house with great accuracy. I will call this the "Oxford Plan No. 2." There is also a small-scale plan, engraved by Loggan, and published by Thomas Bowles, St. Paul's churchyard, about 1714, but I think the engraving itself must be considerably older. Thus we have, at any rate, four plans to refer to, and there is the tradition preserved by Stow that the old cathedral was 690ft. long. This statement Mr. Ferrey has discussed at length in his contribution to "The Three Cathedrals," and I think has very justly come to the conclusion that the first figure is in error, and that the proper statement should have been DXC. instead of DCXC. This extreme length is at variance with all the plans, although some approach to it is made in the Oxford Plan No. 2, which appears to give the length of 660ft. The discovery of the cloister enables the scales put upon these drawings to be tested, and they do not any of them bear the test very well. The Oxford Plan No. 1, however—that which shows the two cathedrals—when a proper scale is made for it, from the full length of 507ft., that is from the extremity of the present apse to the western towers inclusive, shows exactly the proper measure for the south wall of the cloister, which is a strong presumption in favour of the general correctness of the drawing, excepting as to the scale, which may have been added by a different hand. The simplest test which can be applied to the plans in comparing them *inter se*, is that of the proportion between nave and choir taken from centre of tower. These are the results:—

	Nave.	Choir.
Hollar's plan ...	1,000	904
Oxford plan, No. 1 ...	1,000	880
" " No. 2 ...	1,000	998
The small plan ...	1,000	962

There are thus two pairs which hold together pretty fairly, Hollar's and the Oxford No. 1, in giving mean proportion of 1,000 to less than 900, and two others give a much larger proportion. There are a considerable number of perspective views extant, and if we examine these together (however divergent they may be among themselves) the mean result may be used to check the plans. Dugdale gives two. The same engraved sheet which contains Loggan's plan gives three. These results are here tabulated:—

	Nave.	Choir.
Dugdale—North ...	1,000	795
Dugdale—South ...	1,000	785
Loggan—North ...	1,000	752
Loggan—South ...	1,000	917
And to a smaller scale on the same sheet—South ...	1,000	890
Mean ...	1,000	828

My object in this investigation is to establish the probability of the Oxford Plan, No. 1, being

* A reduced copy of this plan is published in Mr. Longman's work, "The Three Cathedrals," and was reproduced in the BUILDING NEWS at the time of our review, Aug. 8, 1873—Vol. XXV., p. 159; see also views of old St. Paul's, pp. 88, 135, 138, of same volume, published July 25 and Aug. 8, 1873.

trustworthy, and the evidence of the perspective views is, as far as is goes, in favour of this probability, in reducing the ratio of the length of the nave to that of the choir. Another argument in its favour is that the extent of our churchyard to the east is exactly the difference of length shown between the old and new cathedral on the plan. And in the account of Sir Christopher Wren's works in the "Parentalia," it is stated that the commissioners for rebuilding the City had settled and had obtained Parliamentary sanction for the width of all the streets before anything had been fully determined about the design for the new fabric. It seems, therefore, extremely probable that the street defines most accurately the extent of the old cathedral, and this is again in favour of the Oxford Plan, No. 1.

(To be concluded next week.)

ROYAL ACADEMY LECTURES ON ARCHITECTURE.

THE first of this year's lectures at the Royal Academy was delivered last night by Prof. E. M. Barry. The subjects dealt with were Recent Artistic Losses, the Gothic Revival, and the late Sir Gilbert Scott. After a tribute to the memory of Sir Gilbert Scott and Mr. Sydney Smirke, Prof. Barry proceeded to review at considerable length the career and character of the late President of the Academy, Sir Francis Grant. He said:—"Of the position in the artist world which will ultimately be assigned by posterity to Sir Francis Grant it would be presumptuous in me to speak. This is not the place for such a discussion, nor am I the person to pursue it. We cannot anticipate that calm inexorable verdict which, sooner or later, is passed upon us all, when we have ceased to play our small part in the world's history. There are personal qualities, however, which contemporaries alone can fully appreciate, and which bring home to us the loss of the individual man we have known and respected, and who but lately was a part, so to speak, of ourselves. Every one knows how gracefully, and with what dignity our late president discharged those duties of his high position which came under the public notice; but those who were brought into frequent contact with him, in regard to the daily business of the Academy, can alone appreciate, to their fullest extent, the finer qualities of his nature and culture. The head of an artistic commonwealth, composed of members with the strong idiosyncracies of individual tastes and genius, the aim of Sir F. Grant was ever to govern with his brethren, and not against them. His sway was that of the mild and excellent constitutional sovereign, and had nothing in common with the sternness of dictatorship. His proudest boast was that he left every member of the Academy a friend, and never, I believe, did he express a truer sentiment."

The life of Sir Francis Grant was another instance of the fact that a real love for their calling was a necessity for all true artists. "An inborn aptitude and love for his art," said Professor Barry, "is at least as necessary for the architect as for the painter or the sculptor, and I advise no young man to adopt the profession without it. The art of the giants of the past, whether of classical or mediæval days, must not be degraded in our hands, and be followed as a mere trade, one method among many of obtaining an honest livelihood. The true architect must ever be an amateur in the highest sense of the word; he must, indeed, be an expert in the science of his work, but he must also have love of his work, and taste to appreciate everything that can claim a place in the advancement of art. Those of you who have had the privilege of attending the annual discourses of our late president, on the recurring occasions of the distribution of prizes, will remember how earnestly he advocated the study of nature on the one hand, and on the other an affectionate reverence for the great masterpieces of antiquity. These lessons, although primarily addressed to the painter students, have, nevertheless, a special value to the architect. Our art is, indeed, traditional to the greatest possible extent, so that the task of the modern architect is development rather than

invention. We can afford, therefore, less than other artists to despise the past and rely on ourselves alone. Lasting fame is not easily acquired, and when a building or other work of art has received the admiration of centuries we may be sure that it merits our respectful consideration."

OUR COMMONPLACE COLUMN.

FONT COVER.

FOR some generations after the removal of the font from a baptistery to a position just within the west entrance of the church the earlier situation was recognised by erecting above the font a canopy of stone, supported on pillars or shafts. In the 14th and 15th centuries this gave place to a wooden cover, of which many examples remain in East Anglia. They are pyramidal or spire-shaped, generally octagonal, and rise from four to eight or even ten feet in height. They are usually constructed of oak, richly carved with shallow mouldings, panelled faces, crocketed angles, and end in a bosky finial. The lower portion of two of the sides open on hinges triptych-wise, to allow the rite to be performed—an indication that the more ancient method of baptism by immersion had been abandoned at the time of the addition of these covers to the fonts. In a few rare and late instances the cover more resembles a sounding-board, and like it is suspended by a chain from the roof. Examples of font-covers may be noted at Sudbury, St. Gregory's, a rich 15th century tabernacle, well carved, with evident traces of gilding, vermillion, and blue in the frets (modern font); Ipswich, St. Matthew's, and several other churches; Ufford - by - Woodbridge, pelican terminal to large and open cover; Fingringhoe, near Colchester, small, opening with three leaves; North Walsham; Trunch, a cover gilt and coloured, supported on six wooden columns outside font; and Worstead. During the congress of the British Archaeological Association last year we examined a series of Elizabethan and Early Jacobean covers in the group of churches in the Walsoken district. Of these that at Terrington St. Clement's, was the most noteworthy. It is of great size, has been decorated inside and without with black and white, red and brown, and gilding, with some Scriptural scenes. That at West Walton is of debased Gothic character, and that at Walpole St. Peter is a larger structure in four stages, each face pierced with circular and lattice-like openings. It is worth careful study as one of the few dated examples—1627. From the journal of the notorious Parliamentary visitor, William Dowsing, of Stratford, we learn that he destroyed the cover of the font of the church of St. Edmund, Southwold, and if equal in treatment to the other woodwork of this church the loss thus occasioned has indeed been great. A few of the more remote great 15th century churches near this decayed fishing borough retain their font covers.—EDWARD W. PIPER.

FOOTINGS

Are introduced at the base of walls so as to obtain a larger bearing surface for the support of superstructure. The spread given will depend on the nature of foundations and the weight of walling. With a good firm bed of gravel for a foundation, after carefully bottoming the trenches, the lowest course of footings may be laid on the gravel, making it equal to twice the thickness of wall, the trench being about 6in. wider to allow for working room. In brickwork this thickness is reduced by $\frac{1}{2}$ -brick offsets on either side, at every course, or every second course, according to the depth of trench. In stonework large stones, with a good bearing surface, should be used. In no case should the depth of footings be less than half the thickness of wall. In friable earthy soil a bed of concrete is usually introduced to support the footings, varying in depth according to nature of material used and weight of building, the width being equal to width of trench, allowing working room for footings. Where a good bed of concrete is put in, the usual spread given to footings may be dispensed with. When solidly bedded, footings of ordinary building stones or hard burnt stocks are seldom weighted up to the load they will bear with safety. Concrete in foundations

with good lias lime or cement may be considered almost equal to stock bricks, and will support a load of from 20 to 40 tons per foot superficial before fracture; 1-tenth of this is usually considered the safe load, but one-half may be taken with safety when in foundations if well supported.—C.W.

FORMERET.

The term applied to the rib in Gothic groining which is close to the wall, and which is, therefore, of less space than the other ribs. See Groining.

FOUNDATIONS.

There are two sources of failure which must be guarded against—viz., inequality of settlement and the lateral escape of the supporting material. To obviate the former it is necessary to drain the site, and to excavate all the loose material, filling up with concrete. In clay soils, fissures often occur due to dryness, and it is safest in such cases to lay the footings of wall below the depth at which the weather affects the soil, usually about 3ft. Blue shale is treacherous on this account. When dry, or when the ground is first opened, it is as hard as rock, but a few hours' exposure causes it to slake or run to sludge. One great principle to which recourse may be had is to extend the bearing surface of the foundation. This may be done in several ways: 1, by a layer of stones or planks or a combination of timber and stones; 2, by brick footings; 3, by concrete; 4, by inserted arches. Timber is objectionable when it cannot be maintained either uniformly dry or wet, and the best plan is to form a wide base of concrete, which, if properly consolidated, forms a beam upon which the wall settles evenly. *Concrete foundations:* Gravel ballast or broken stone may be employed, and a certain quantity of sand or chips. No stone should exceed a hen's egg in size. The lime is generally used ground and hot, and is mixed with the stones by turning the mass round by the shovel till the components are well incorporated. The proportion of mixture is generally 6 of ballast to 1 of lime. The concrete thus prepared is either thrown into the trenches from stages 6 to 8ft. above, or rammed in layers of 1ft. to 6in. The last plan is recommended as the best. Hydraulic lime is to be preferred, as the blue lias, or Portland cement (see art. Concrete) may be used. A second source of failure is in the lateral escape of the supporting material as when building on running sand or soft clay, which would ooze out below under a heavy weight. In addition to a concrete base of sufficient width, the area of a foundation in such a case should be enclosed with sheet piling. Where there is a hard stratum below, wooden piles shod with iron may be driven down, the heads cut off to a level, and the wall commenced on a timber platform.

"J. A." says:—"When a firm foundation is required where no firm bottom can be found within an available depth, piles are driven to consolidate the mass a few feet below the area of foundation, which is surrounded by a row of sheet piling to prevent the escape of the soil; the space between the pile heads is then filled to the depth of several feet with stones and concrete, and the whole is covered with a timber platform. Concrete composed of gravel or shingle and hot lime is often used to form a solid bearing for the footings of foundations. Instead of driving piles into soft ground it is considered better to bore holes in the ground, and well fill them with sand, which, from its property of acting almost as a fluid, is more valuable for distributing pressure over a large surface. In many soils, where the ground is too soft for the weight of the walls of the building, it is very effective to dig wide trenches, and fill them with dry sand; this has been sometimes found better than timber planking, concrete, &c. The breadth of a substructure should be proportioned to the weight of the superstructure. Nicholson, in his 'Architectural Dictionary,' says: 'If the texture of the ground is supposed to be constant, and the materials of the same specific gravity, the breadth of the foundation will be as the area of the vertical section passing through the line on which the breadth is measured.' Probably after rock the best natural soil is a compact or sandy gravel."

"C. P. E." writes:—"The suggestions and instructions issued by the Incorporated Church Building Society say: 'To be surrounded, if requisite, by good covered drains. If the soil wants firmness the walls may often be better secured from partial settlements by spreading the foundations on each side, than by deepening or resorting to more expensive works. In all irregular or doubtful soils concrete is recommended for the foundations in preference to any other material.'"

FRENCH CASEMENTS

May be constructed either to open inwards or outwards. They are usually hung folding in solid frames, the openings being frequently used as doorways. In exposed situations there is some difficulty in keeping the weather out, especially when hung to open inwards. A good mode of construction is to form a tongue on the back edges of hanging stiles, fitting into a corresponding groove worked on frame behind the usual rebated stop. The meeting stiles may be finished with a splayed double hook-point or rebate, beaded on the edge, or with a hollow on one edge, and a corresponding projection on the other, locking into each other in the act of shutting. With the first, as a further precaution, a weather fillet may be fixed to lap over the joint on the outside. When a fanlight is required the bottom rail of light and the top rail of sash may be finished with a rebate, or with a hook-joint. When a solid transom is used it should be weathered and throated so



as to throw off the water readily. A weather-board is also requisite along the head of frame for the same purpose. The sill of frame is generally of oak or pitch-pine, sunk, weathered on top, and sunk or tongued to countersill, and rebated inside, with a channel formed to prevent the passage of water. A metal water-bar is frequently introduced—projecting above the sill—of a rectangular or curved form; or a flat bar, hinged, and falling flat when the casement is opened, offers less obstruction. The bottom rail of casement is rebated to correspond with a projecting apron, weathered and throated to form a drip outside. For casements opening outwards the ordinary stop, supplemented by strips of some elastic material, will be found to keep the wet out. The accompanying sketch shows a good method of finishing the sill when no special water bar is used. The channel formed inside the rebate, with the groove over, intercepts any water passing inside. It is conveyed to the outside by holes formed at intervals, as shown by dotted lines. —C. W.

FRESCO.

This art is of great antiquity, and we refer the reader to Mr. Merrifield's and other works on the "History of the Art of Fresco Painting." Fresco is a term only correctly applied to painting upon fresh floated mortar, with water colour in raw pigments, and must not be confounded with painting in oil upon walls—a practice very doubtful, and certainly not durable. The lime and its salts produce rapid decomposition, and turn the colour black, as may be seen in Hampton Court, British Museum, &c. It has been well observed that oil painting is not suitable to a severe style of architecture—it is too rich and varied. In fresco painting the design must be prepared and defined before commencing, as it is impossible to retouch a fresco painting after the mortar has set. The drawings are usually executed with charcoal on paper, and a coloured sketch of the composition should be prepared, as it is difficult to alter colours. Brick-built walls, well dried, and of equal absorbency, are

desirable, but we should recommend hollow walls as the best. In Italy the practice of lathing walls is unknown, though some of the ceiling frescoes are on lath. Lathed walls are liable to bulge. The Munich frescoes are painted on plastered brick walls. In Italy 2 parts of sand to 1 of lime is adopted. The first coat should be rough; and in Munich an admixture of small flint pebbles is used in the rough cast. The selection of lime is important; that obtained from the limestone procurable on Durham Down, near Bristol, has been recommended, consisting of 99.5 per cent. of carbonate of lime, but upon this and other practical points we refer the reader to Mr. Cave Thomas's work on "Mural Decoration."

"Haydon," on fresco, says:—"The power of light which the reflection of lime produces, shining through the colours placed on it, renders fresco, in spite of its deficiency of shadow, fitter for public decoration than oil, whose power lies in its gorgeous shadow. Fresco is not desirable, because it is practised on a despotic material, and therefore requires a resolute and unerring hand, a fixed eye, and steady brain. It is desirable for its beauties, not for its obstructions. You must take the process as it is, and as it has been done effectually by Italians and Greeks, as it has been effectually used as an engine by the modern Germans, though far from the perfection of Raffaele, there is no reason on earth why it may not be also adopted by the British school. Again, as colours are in reality tinted water, and as fresco and stucco have a tendency to imbibe water, colours ground in water become incorporated with lime, water, and sand, and when dry they are not to be again dissolved by water; and the basis of fresco and its colours thus become harder than the stone by drying. If the stucco dry too rapidly, as it always does in a hot climate, it does not dry thorough, and this is the reason why, in my opinion, the climate of England, being moist, is more adapted for fresco than Italy itself. Here certainly we have no chance of fresco drying too soon on the surface; but mortar dries here as hard as in Italy, and wherever mortar dries hard there fresco may be safely practised."—C. P. E.

"J. A." sends the following notes: The walls of the baths of Titus at Rome are covered first with a layer of coarse sand and lime, about $\frac{1}{2}$ in. thick; above this a thick layer of lime and pozzolana, with an admixture of sand and pounded brick; the third and upper coat is of lime and pounded marble. The third loggia of the Vatican, painted by Giovanni da Udine, is much the same as this. The selection of the limestone to be employed in fresco painting, both for the ground and for the white, is a matter of great importance; it should be nearly pure carbonate of lime. Modern fresco painters recommend the lime to be kept a much longer period than Cemmi and other early writers direct. If it is used too fresh it blisters, and sometimes turns the colours to a brownish-red. The lime for the "intonaco" (fresh coat) in fresco painting must not be entirely carbonated or it would not set. The picture must be executed while the "intonaco" is wet or soft, no more work being commenced than can be completed within the time (a few hours) that the plaster takes to harden. Before laying on the "intonaco" the prepared ground must be repeatedly wetted until it will absorb no more; then a thin layer or coat of moderately rough plaster of sand and lime must be laid over as much of the wet surface as can be painted in one day. As soon as this coat begins to set (in about ten minutes or so) another thin coat must be laid on with a wooden trowel, both layers together being scarcely $\frac{1}{2}$ in. thick. Upon this coat the fresco is painted. This intonaco will be fit to paint on in about a quarter of an hour. First process in executing the picture is to pounce or trace the outline of the allotted work, then the painting may be commenced in thin watery washes from the finished coloured sketch. After the first wash is finished, 20 or 30 minutes should elapse for the absorption of the water. While the intonaco is wet, a repetition of the same tint will have the effect of a darker tint—as in tempera drawing. The surface must be kept moist (but not wet) while painting, or the superadded colour will not

unite with the one beneath. When the portion of the picture allotted for the day's work is completed, the superfluous portions of the intonaco should carefully be cut away. In the next day's work the surface must be wetted as before, and the edging of the finished piece carefully moistened with a brush; the operations are then continued as on the previous day. The colours used in fresco painting are all ground and mixed in water, boiled or distilled; they are chiefly earths. Lime, ochres, Sienna, vitriol, Verona green, cobalt, chromo, ultramarine, and vermilion are the chief colouring substances used. Before being applied they must be mixed with white—that is, with lime—which may be considered the vehicle or means of attaching them to the ground. The brushes and pencils are made of hog's hair and otter's hair. Sufficient of each tint is kept ready for the whole picture. The method of fresco secco or dry fresco is thus practised: The plastering of the wall having been completed the whole is allowed to dry. Previous to painting the surface of the intonaco is rubbed with pumice-stone, and on the evening of the day before the painting is to be commenced it is thoroughly washed with water mixed with a little lime; it is wetted again the next morning, and is then ready for pouncing the outline and painting; the wall must be kept constantly moist by means of a syringe. Frescoes are sometimes cleaned by dry bread; sometimes water, vinegar, or wine. Fresco painting may be adopted in the decoration of country residences, but in a smoky atmosphere, or when improper building materials are used, they do not long retain their freshness and colour.

FRITHSTOOL.

Literally "seat of peace" is a seat or chair, says Mr. Parker, placed near the altar, intended for those who claimed the privilege of sanctuary, and for the violation of which the severest punishment was decreed. They were generally of stone, and were hollowed out as at Beverley Minster (see Parker's dictionary), and placed in the north aisle of chancel.

A new hotel is about to be built on the Viaduct and West Walls, Carlisle, from the designs of Mr. Birkett.

Mr. Alderman Thomas Roe, sen., of Derby, the head of the firm of Roe and Sen, timber merchants, of that town, died on Tuesday week, aged 74. Mr. Roe commenced as a wood-sawyer, and some fifty years ago started in business as a dealer in timber, and by shrewdness, industry, and indomitable perseverance developed an extensive trade. Since 1856 he has been one of the foremost members of the Derby Town Council, and lived to see many of his schemes for public improvement (especially those for street widening) carried to successful completion. Amongst these may be mentioned the baths and wash-houses, cattle market, corn exchange, market-hall (the memorial stone of which he laid in 1865 during his second year of office as mayor), widening of Irongate, St. James-street improvement, Sadlergate-bridge, and Siddals-road improvement, and the new thoroughfare from the Post-office to Cheapside, now being carried out by Mr. Woodiwise, the contractor.

Mr. J. Buchanan has been elected draughtsman in the office of the borough surveyor of Plymouth.

New Board Schools have just been completed at Llangedock, South Wales. Mr. John Rees was the contractor.

New schools and residence are about to be commenced at Waldersea for the Wisbech School Board, from designs supplied by their architects, Messrs. Adams and Sen, of Wisbech and Lynn.

A Local Government Board inquiry was held at Merthyr, on Friday, before Mr. Arnold Taylor, in respect to an application from the Merthyr Local Board of Health for permission to borrow £12,120 for the purposes of acquiring additional land for the disposal of sewage, the erection of a new bridge at Troedyrhiw, and for street improvements. There was no opposition to the application.

New Board Schools were opened at Falmouth on Monday. They are situated near Frisey-terrace, and accommodate 300 children. They are Gothic in style, and the plan is that of a Latin cross. The facings are of limestone with Bath dressings and local stone backing; the roofs are open and slated. Attached to the building is a tower with spire of Bath stone rising 80ft. from the ground. In the tower is a clock with 4 dials and bell. Mr. Hicks was the architect, and Messrs. Oliver and Sons were the contractors; the cost was £2,400.

Building Intelligence.

ARMAGH.—A new Presbyterian church in Armagh is approaching completion from the designs of Messrs. Young and Mackenzie, of Donegall-square, Belfast, the contractors being Messrs. James and Jacob Guiler, of Belfast. The church consists of nave, aisles, and lofty tower and spire at the north-west angle of the building. The edifice is built of Armagh marble, but the dressings are of Dungannon stone. The style is Decorated Gothic. The carving has been executed by Mr. Harry Hems, of Exeter. Mr. Rhind is the clerk of the works.

FAILSWORTH.—Dob-lane Chapel, Failsworth, was opened on Jan. 22. The building is Gothic, of the Early Geometric Pointed style. The principal front faces Oldham-road, which is south. The walls are filled with arcading, the panels to be decorated in diaper and stencil work. The seating is pitch-pine, open, with carved bench-ends. The building is heated by hot water. The works have been ably carried out by Mr. David Adams, of Harpurhey, from the designs and under the superintendence of Messrs. Adams and Son, architects, King's Lynn.

ST. TEATH, CORNWALL.—The parish church of St. Teath—perhaps one of the most dilapidated in all Cornwall—is, says a Plymouth paper, about to undergo a thorough and “conservative” restoration. The main fabric was built in the 15th century, but there are earlier remains, and the present tower was added some 200 years later, at which period the interior of the church was remodelled, as is shown by the Jacobean wood-carving in the pulpit, screens, &c., and in the wall decoration found under the present thick coat of white lime. The nave and aisles contain a large number of the original oak seats with richly-carved ends, and on these ancient benches have been erected deal “pens” of various shapes and sizes. All the ancient seats and the interesting Jacobean pulpit will be retained and repaired. Attached to the westernmost benches is an ancient poor-box, probably unique in its decorations. Painted on the several sides are figures representing the maimed, the halt, and the blind. The windows at St. Teath's were formerly filled with stained glass, and fragments, which are to be carefully preserved, remain in the tracery. The nave arcades are each more than a foot out of the perpendicular. The roofs for the most part are plastered over, and the whole interior—walls, roofs, granite columns, arches, and even a recumbent figure of an ecclesiastic—is covered with whitewash. The removal of the nave ceiling has disclosed an open roof with moulded and carved timbers in a fair state of preservation. These will be restored in oak, the arcades will be set upright, the walls and windows put in a substantial condition, and the chancel will be refitted, and a new roof put over it in place of a decayed wooden one. For the greater part of this restoration a contract has been entered into by Mr. Wiffin, of Bradford, North Devon, who will work under the supervision and from the designs of Mr. Hine, of Plymouth.

On Wednesday week the new Church of St. Bartholomew, at Charlton, by Dover, was opened. The building has been in course of erection for the past eighteen months, the architect employed being Mr. F. S. Clark, F.S.A., and the builder Mr. W. J. Adcock, of Dover. The church will seat 750 persons.

The cathedral yard of St. Asaph is being thoroughly and deeply drained in connection with the new system of drainage for the city and district. Mr. Jeffries is the contractor for these works, and also for the sewerage of Denbigh, recently carried out.

A Local Government Board inquiry was held at Taunton on Wednesday week, before Mr. Arnold Taylor, in reference to an application from the town council for sanction to borrow £1,200 for draining the districts of Rowbarton and Sterford. The inspector pronounced the plans satisfactory, except in one matter of detail, and strongly urged the ventilation of all the sewers in the town—a course to which the town council has hitherto been opposed.

The death is announced, at the age of 69 years, of Mr. Charles Christopher Black, M.A., late of the Art Museum, South Kensington.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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DRAWINGS RECEIVED.—R. W.—A. W.—J. L.

E. B. B. (You can find the true north by a mariner's compass if you allow for the variation, which is always given for several years in the *Nautical Almanac*. The variation is caused by the shifting of the magnetic pole. Previous to 1657 the needle pointed east of north; in that year it pointed due north in London, and having reached its greatest western variation, some 25°, it is now slowly returning to the north pole, on reaching which it will proceed eastwards, and again return, the period being some 650 years.)—YOUNG CARVER. (Write B. T. Batsford, 52, High Holborn.)—HOPKINS. (E. and F. N. Spon, 48, Charing-cross.)—CHIPS. (We have heard nothing of the Norwegian houses for some time. We believe they were introduced into this country commercially, but don't know. For the purposes you mention we should think Lacelles' concrete slabs would be suitable. You can obtain all particulars from the patentee, 121, Bushill-row, E.C.)—GEORGE LEOE and SON. (We do not give names and addresses.)—H. R. (The most reliable rules are those published by the Local Government Board on work-houses. We do not know of any treatises on the subject.)—H. J. PEARSON. (There are so many books on cottage architecture that it is difficult to recommend. Messrs. Audsley's "Villa and Cottage Designs" is one of the best we know of. There is also a treatise in Lockwood's series.)—RUSSELLS. (Fairbairn's work "On the Application of Cast and Wrought Iron to Building Purposes" is one of the best treatises. On the valuation of property consult a treatise on "House Property," by E. L. Tarbuck.)

"BUILDING NEWS" DESIGNING CLUB.

CONVENS. (We cannot account for omitting to notice in our criticism your drawings under above motto, as it is our rule to mention every design we receive, and we are inclined to think it must have been misprinted under a wrong motto. We shall take care your next design is noticed.)

Correspondence.

"PUT YOURSELF IN HIS PLACE."

To the Editor of the BUILDING NEWS.

SIR,—If I were a builder of some little cunning and no great honesty I might perhaps have some such thoughts as these:—

"My interest is to have bills of quantities 'full.' We all understand, in our trade, what that means. The only point is how to manage it without the knowledge of the architect and the client. To do that we must get the quantities taken out by a builder's man, who is obliged to keep in favour with builders if he means to make a living. Somebody said in the BUILDING NEWS last week that a surveyor is a

builder's man. It was very silly of him to let it out, but it is true, nevertheless. So surveyors' quantities for ever—and down with the architects! Who wants an architect to know where all the 'fat' in a contract is? He will only cut it out, or use it as a set-off against extras. No builder of any sort likes architects' quantities. They are taken too close, for the architect is thinking all the while how to keep the tenders from exceeding his estimate. Some people say, 'Base the contract on the quantities, and then you will be accurately paid for all the work you do.' Now I don't want it to be generally known, but being accurately paid is the very thing I object to.

"How green some people are! It is not very likely I should write to the papers and object to architects' quantities if they were generally excessive. Anybody, you would think, might see with half an eye which system is worst for the client by seeing which is the favourite with one. But let me only send a clever letter to the BUILDING NEWS, and you will find it is not so. Let me throw plenty of mud at architects (anybody is an architect that draws a plan), and I warrant some will stick.

"A first-rate dodge that was that my friend 'Plausible,' the eminent saint and contractor, invented not long ago. 'Plausible' is a great man with the Little Bethelites, and some of them were going to build a chapel. The moment the design was accepted 'Plausible' offered to get the quantities taken out by his own surveyor, and to send in a tender, and further if this tender should be too high, he offered the committee the use of the quantities at a nominal cost to get other tenders from. It was a noble offer, the committee thought, and of course they jumped at it. What 'Plausible' said to his surveyor I don't know, because I was not there. Perhaps he told him to take off the quantities closely and accurately—perhaps he did not. At any rate, by some chance or other they were not so close as they might have been, and I should not wonder if 'Plausible' knew it. He sent his tender in, and it was too high. The committee fell back on his offer, had his quantities copied, and got in other tenders. Far be it from me to lay the fault on the quantities, but the lowest tender was still too high, and the committee were in despair. The difference, indeed, was not above 15 per cent., and the architect could have arranged the necessary deductions in an hour with the builder whose tender was lowest. This builder, however, had no friends on the committee—Mr. 'Plausible' had. His friends went straight off to him and begged him to help them out of their trouble. No doubt he was surprised to see them at the door—no doubt he was grieved to take the work away from the man whose tender had fairly earned it, but in the end his feelings of friendship were too strong for him. He sent the deputation away overwhelmed with gratitude, and bearing with them as a precious document the following:—"Contract: I, Simon Plausible, undertake that the chapel at Goose-common shall not cost more than two thousand pounds, provided I may alter and omit whatever I choose in the plans and specification." On this basis the work was done. There was no searching and spying to see what Mr. 'Plausible' was pleased to omit and alter, for that gentleman's delicate sense of honour revolted against any supervision by an architect. It is believed that the contract was a paying one, and don't I wish I had half a dozen like it? No drawings to be bound down to, no specification to fix the quality of the work, no architect to be always prowling about and finding fault with the materials; and with all this, the quantities well on the right side to begin with. Surveyors for ever, and let every builder get his own quantities taken out if he can!"

Something of this sort, Sir, is what I might possibly think if I were a dishonest builder, waiting for the chance of robbing every one who trusted me. An honest builder (and I believe there are as many honest men in the building profession as in any other) is satisfied with a fair price on a fair bill of quantities, and hence, when the contract is based on the quantities, so that he neither loses when they are "short," nor gains when they are "full," it is a matter of perfect indifference to him whether the architect or any one else prepares them.—I am, &c.,

VERAX.

CONTRACT SCHEDULE OF PRICES.

SIR.—In reply to "Constant Reader" and as one who has had to deal with questions of extras and omissions on contracts extending over many years, I beg to inform him that in ordinary cases the schedule would be applicable to both extras and omissions alike; but cases frequently occur where the extras involve greater expense than the value of a similar quantity of omitted work—for instance, in the case referred to by your correspondent the quality of the material in the concrete may have been different, or the expense of placing it in position greater.

There is another point which architects and engineers frequently lose sight of when they vary the quantity or quality of work in a contract—viz., the builder in most cases, before he sends in his tender, obtains a price and enters into an agreement (conditional on obtaining the contract) for the supply of his materials, and any variation afterwards will be used by the merchant to his own advantage. I have frequently known cases where a builder has bought the contents of a brickfield at a moderate price which enabled him to tender low and so obtain a certain contract. Afterwards the quantity of brickwork was greatly increased, and the builder had to pay 25 or more per cent. for his bricks; on the other hand, the engineer may change his mind after the contract is entered into—not an uncommon thing, I can assure you, in certain Government departments—and availing himself of a schedule of prices substitute concrete for brickwork or masonry. Can he, in all fairness, expect to do this without compensating the builder, who cannot get over his agreement with the merchant except at a loss?

When extras and omissions enter into a contract great delicacy and tact are required so that the builder shall not be a loser nor the employer be charged more than he has a right to pay. These are the cases where an experienced professional surveyor, who is well acquainted with builders and their accounts, becomes of value to an employer, for no one else can protect him from undue claims made by a dishonest builder.

No architect, engineer, or clerk of works can have the experience necessary in cases of this kind, because the builder's accounts and transactions are dead secrets to them, whereas the professional and independent surveyor, from having on previous occasions represented builders, is thoroughly experienced in all their ways, and he only has a chance of detecting whether a builder's claim is trumped up or not.—I am, &c., J. S.

COALITION OF SOME ARCHITECTS WITH QUANTITY SURVEYORS AND CONTRACTORS, AND THE RESULTS.

SIR.—I cannot but coincide with "Old Builder" in his opinion that your correspondent who stated clients must be "green indeed" if they do not know they are charged with bills of quantities, &c., is labouring under a very erroneous impression. If they were aware of it is likely they would, without investigation and remonstrance, complacently pay the surcharges I have drawn attention to, such as 2 per cent., or its equivalent, for bills, 2 per cent. more for measuring and making out the measured-works accounts, 2 per cent. more for making out the day-work accounts, 1 per cent. more for "omissions" (all quantity surveyor's "perqs."), and lastly, 1 per cent. for contractors as contingencies, the whole representing an augmented expenditure over and above the computed cost of the work?

I had nearly forgotten to mention, in connection with these cases, that in the adjustment of the final accounts a large amount of unmeasured work (£50,000 or £60,000 in value perhaps) was settled amicably by the novel expedient of a compromise, which strange proceeding was effected between architect, surveyor, and contractors, at a cost doubtlessly on the broad-shouldered clients for commission to surveyor (in addition to above), say about £1,000, blended and incorporated with the sum fixed upon by mutual consent of the self-elected delegates named.

It has occurred to me, since reading the various contributions on the absorbing topic of

architects and surveyors, and the harmony and concord of contractors—whose lyres are tuned with theirs to one set chord—that I ought to lift the veil that has hazed my letters, and for the enlightenment of the authors of them, to state, in the cases to which I have made reference (which must be, from their incongruity and inconsistency, of a very exceptional character, I would fain believe), the architect alluded to for many years has given his exclusive services to his employers at a remuneration in shape of an annual stipend, of not less than £2,000, but I feel it is due to him to explain that he had nothing to do with the bills of quantities, as those were supplied by a surveyor of something like thirty years' standing; therefore, to put them in the category of "quacks" would mortally wound their highly-sensitive natures. Of the contractors I may say they are men moving in the first rank about town as builders and traders, and the victims or sufferers, *ergo* clients, are corporate and municipal bodies. The locale of the plot is London, within the prescribed limits of the eight-mile radius, and the periods between 1873 and 1878!

It is very curious to note the opinion of those who should be authorities in the matter of percentages, differing as they do so materially, and not the less so respecting the real position of the surveyor. Some aver he is ostensibly the builder's ally, others assert by implication, and some positively insist that he properly belongs to the architect, and that "seldom the contractor has a voice in his appointment." In the cases I have dwelt upon, as I have before intimated, he was employed by the architect (as his note by me will verify), and if not by the builders as well the latter paid him as provided for through their accounts by the delicate process of manipulation referred to, and the trusting, confiding, innocent clients bore the incubus; but "where ignorance is bliss 'tis folly to be wise!"—I am, &c.,

CONSTANT READER.

PENMAENMAWR OR BLUE WELSH STONE.

SIR.—The thanks of municipal engineers and surveyors are due to the Bradford borough surveyor for the letter you kindly published on the 17th inst. Having had some experience of the blue Welsh sett (the principal streets of this city being paved with that material), I can agree with the opinions expressed by Mr. Allison thereon; but if I read a portion of his report aright, I must dissent from what appears to be the wholesale condemnation of Penmaenmawr stone, and as his remarks may have a tendency to mislead those who have not yet had an opportunity of becoming acquainted with the stone now sent from Penmaenmawr, I beg to say that on an official visit to the North Wales quarries last year I found that the proprietors of the blue Welsh stone had ceased working their quarry, and that the other quarries in the neighbourhood were turning out a much superior pavé sett, grey in colour, very durable, and fairly open-grained.

I may also mention that in the construction of the Chester tramways the Penmaenmawr stone, known here as "Darbishires' Granite," is used for paving, in conjunction with setts from other quarries, so that a fair comparison may be made by any one interested visiting our ancient city.—I am, &c.,

J. MATTHEWS JONES, A.I.C.E., City Surveyor.
Chester, Jan. 24, 1879.

P.S.—I see on reading yours of to-day that Darbishires and Co. have written you on the subject, but as they are quarry-owners, an independent testimony may be of more interest to borough surveyors and your readers generally.

At Great Harwood, near Preston, on Wednesday week, Mr. J. Thornhill Harrison, C.E., held a Local Government Board inquiry with regard to an application from the local board of that district for sanction to borrow £1,000 for erecting new offices, a fire-brigade station, &c., in accordance with plans and designs prepared by Mr. J. P. S. Varley, architect. There was no opposition.

On Thursday in last week Col. Ponsouby Cox, one of the inspectors of the Local Government Board, held an inquiry at Lytham, Lancashire, respecting an application for sanction to borrow £6,000 for sewerage purposes, to be expended in the town. There was no opposition offered to the scheme.

Works of water supply are being carried out at Llanelly for the local board. Messrs. Beardmore and Barnes are the engineers, and Messrs. Smith and Fawcels the contractors.

The new Jewin Welsh Calvinistic Methodist chapel, in Bridgewater gardens, Aldersgate-street, E.C., was opened a fortnight since. It represents the oldest Welsh chapel in London, and has been built at a cost of £5,000; 630 sittings are provided.

Intercommunication.

QUESTIONS.

[5660.]—**Sea-washed Road.**—I have built a concrete sea-wall, and have to make a road in front of it 150ft. for public use. There is black clay for basis. The sea rises against the sea-wall about 3ft., so that it is not easy to see how to make a firm road at the least expense. There are no stones within miles, but abundance of clean pit gravel and coarse sand on the spot. Concrete blocks would be too costly. The road will have to be 10ft. wide, and formed with an average of 6ft. depth. Will any engineer kindly suggest the quickest and cheapest way in which I can form this road during tide intervals when the sea retreats from 60ft. to 100ft.? Occasionally the sea is driven 8ft. higher against the sea-wall. I am anxious to make the road as soon as possible to spare public inconvenience.—A SUBSCRIBER.

[5661.]—**All Saints' Church, Stoke Newington.**—Will Messrs. Dollman and Allen, when they supply the particulars of their design of All Saints', Stoke Newington, also explain the scio-graphy of their drawing, which, as you say, has had the double honour of an exhibit in the Royal Academy, and also in your pages? How do they account for the miraculous tower shadow on the main roof, and for the absence of shadow on the north gable of west porch?—AN ARCHITECT.

[5662.]—**Builders' Charges.**—Some months ago a builder in one of the midland counties was asked by an architect to tender for alterations proposed to be made on a certain building. As no plans had been prepared he was instructed to visit the building himself and take all his own particulars. He did so, but as his tender was thought to be high another contractor was called in, and his tender being much lower was accepted. The first named builder now sends in a bill to the architect for time spent by him in visiting the building, and also charges for quantities—viz., 1½ per cent. on the amount of his tender. Perhaps some of your numerous readers will kindly inform me whether it is customary for builders to charge architects for time spent in preparing their tenders, and if such a charge would hold good in a court of law.—GREENHOOD.

[5663.]—**Plain Tile Roofs.**—Having noticed that wet was penetrating in many places the roof of some houses I have under my care I had the roofs repaired, but found that they were worse after the operation than they were before. I had them again repaired, and the result is worse than ever. They are covered with plain tiles, and to outward appearance seem to be sound and in good condition. They are, however, old, and it has occurred to me that the mere fact of workmen getting on them may probably be the cause of fresh drainage. Doubtless others have met with similar cases, and I should be greatly obliged to any one who will be kind enough to give me the benefit of their experience in such matters, and help me to finding an effectual remedy.—W.

[5664.]—**Sea Water.**—Will some one kindly inform me how and in what way sea water mixed with lime would affect it chemically, and if the same effect would be produced on Portland cement as on ordinary grey-stone lime or lias lime, also for what reason is sea sand objected to for mortar and cement work generally?—J. X. B.

[5665.]—**Strains.**—Will some reader kindly show how the strains in roof trusses are measured (as for example in a kingpost roof-truss) by graphical means, and how to calculate weight borne by each point of support of truss? A diagram showing strains worked out would greatly oblige.—MUDDLED.

[5666.]—**Carrying Weight of Bridges.**—Is there any simple rule for calculating approximately the weights brick or stone bridges can carry?—C. S.

[5667.]—**Portland Cement.**—Can any of your readers furnish information as to the first inventors or introducers of Portland cement? I find in the new edition of "Encyclopædia Britannica" that Mr. Parker was the first introducer of Roman cement, made from the calcareous nodules from the London clay and other similar formations. Also that General Pasley in England and M. Vicat in France made experiments in the formation of an artificial hydraulic cement, but the authors of the system of making cement from river mud, clay, and chalk—Portland cement, in fact—are merely referred to as the "inventors." Who they or he were, and some notice of the early history of what is now so familiar, would greatly oblige.—CRETA.

[5668.]—**All Hallows, Bread-street.**—May I ask, through the medium of your paper, if it be intended to incorporate, in the buildings now being erected on the site of the above church, the tablet commemorative of Milton, so well known to all passers-by in former times?—COMUS.

REPLIES.

[5641.]—**Flues.**—I beg to support the idea that the present large area of our chimney flues is an absurdity. Instead of 9in. by 14in., or even 9in. by 9in., I consider a 6in. pipe would be ample for rooms, and also kitchens of smaller houses, while a 7½in. pipe would do for larger kitchens, where extra large

fires are kept on. The area of my own kitchen vent was 12in. by 12in. I put a chimney can upon its top, 6in. diameter at the bottom, and it works quite well.—W. P. BUCHAN.

[5645].—**Stability of Walls.**—The rule for the resistance when the face of wall is at right angles to the surface of ground at top is given by Prouy, and is $R = \frac{w}{2} h^2 \tan^2 \frac{1}{2} c$, in which R = horizontal resistance, w the weight of a cubic foot of bank, and h the height of wall, and c the angle made between fan of wall and line of repose of the material. For about one-third the height of such a wall the thickness should be about one-third of the wall's height. When the top of bank slopes at the angle of repose, the resistance required is about double, or not greater than 3 to 1. In reservoirs the resistances are equal.—G. H. G.

[5646].—**Condensation on Walls.**—The painted surfaces might be prepared, but the best plan is to remove the paint and plaster the walls. If ventilators at the ceiling line and inlet opening at the skirting level be introduced, I do not think there would be much condensation. There is a very good lining for walls upon which moisture does not condense. It is made of a species of linoleum, and is called the "Sunbury Wall Decoration."—G. H. G.

[5646].—**Condensation on Walls.**—Instead of reading "that during wet weather," &c., "there appeared," read "that during hot weather," &c., which completely alters the sense.—C. C.

[5647].—**Glass.**—White obscured glass, similar to white gas globes, may be obtained in sheets of all thicknesses. Sheet and plate glass may be rendered white obscured by rubbing flour, emery, and water over the surface with another piece of glass.—JOHN ALGAE.

[5651].—**The Use of Statuary Marble in Outdoor Work.**—Statuary marble is not used with any success in outdoor work in this country. Cemetery masons affect it sometimes, but the material has no stability.—A. M.

[5651].—**The Use of Statuary Marble in Outdoor Work.**—Statuary marble is never used for outdoor work by any one who understands the resisting powers of foreign marbles. There is probably not a statue in Great Britain made of that material standing anywhere out of doors. If such a mistake does exist, it has undoubtedly lost all elegance of detail or sharpness of outline, as the marble has become so "angry" that it is wearing away. I fully confirm Mr. Harry Hems' experiences and think with him that the sharp London marble merchant was merely "trying it on" with the provincial architect.—YORKSHIRE.

[5651].—**The Use of Statuary Marble out of Doors.**—The Exeter architect will eschew the use of statuary marble for exterior work if he be wise. Statuary is a delicate and expensive material, admirably adapted for internal sculpture, but utterly unsuitable for external uses. It is not only unable to resist the influences of our climate, but it is in other respects altogether too delicate a stone to admit of its withstanding the thousand and one dangers to which it would be exposed in such a position. It stains so readily that where Sicilian or similar marbles would go scot free statuary would be irredeemably ruined.—J. T. D.

[5652].—**Cast of Carvings.**—Impressions from stone carvings may be readily taken with ordinary modelling (pipe) clay. Let it be kneaded up to the consistency required for general modelling purposes—i.e., soft but not sticky. This done, it is a simple matter to take what is technically called "a squeeze" of the carvings desired. In pressing the clay on, take care that it gets into all the recesses and shadows, and then lift the whole off in a lump. Place this, inverted, upon a board, and a cast may be obtained at leisure. To do so, mix up plaster of Paris in a bowl, under the ordinary fashion, and then turn it into the clay mould. In ten minutes or so the plaster will have set, and a perfect cast will be the result. Now tear away the clay, carefully pick out any little bits of plaster, &c., that may be adhering thereto, and it is ready again for fresh "squeezing" purposes. Pipeclay is procured in large quantities in Devon, principally in the neighbourhood of Chudleigh. Its cost, in Exeter, is a shilling a quarter of a hundredweight. In London the price is a trifle higher, I think. The Princess Louise, whose taste for and skill in modelling is well known, has recently found to her concern that no modelling clay was to be found in Canada. A quantity of it has just been sent over from this country for her Royal Highness's especial use. Pipeclay, however, is much too dirty a material for using upon woodwork. It answers the purpose, but it leaves a stain that comes out some twelve hours after it has been pressed upon the carving. This blot is an exceedingly offensive white patchy mark, which adheres so tenaciously to the place that nothing but endless scrubbing will eradicate it. The best thing for using on woodwork is "squeezing" wax. It is applied precisely as the clay is used. Squeezing wax cannot—so far as I know—be bought. I gave a receipt for making it in these columns four years ago to-day (BUILDING NEWS, Jan. 29, 1875). The cost of ingredients for making it is about 2s. 6d. per lb. Like the clay, the same wax may, with ordinary care, be re-used over and over again—for a lifetime, in fact.—HARRY HEMS.

[5655].—**Surveyors.**—In reply to "Surveyor," the practice has always been where the employer and the builder each nominate a surveyor, that they do the work between them—the builder's surveyor taking the lead as representing the party whose interest is most vital, while the employer's surveyor does the checking, each surveyor writing his own dimensions, which are afterwards squared, and then compared with those of the opposite party; but as there can only be one abstract, it should be prepared by the builder's surveyor, and checked by the employer's. From this abstract, when completed and checked, the bills are made out by the builder's surveyor and checked by the other. Both surveyors are then legally responsible to their employers for errors, but when the architect takes the matter into his own hands, he or his surveyor only is responsible to the employer, and it is open to the builder to question the accuracy of the account. When the surveyors are properly nominated by each party, they act somewhat as arbitrators, and the arrangement comes to be binding on both parties, each, however, having a remedy against his own surveyor in case of fraud or collusion.—J. S.

[5655].—**Surveyors.**—In reply to question (a), the proprietor's surveyor is bound to watch his client's interests, and to render every facility to the builder's surveyor; the builder's surveyor acts also for his employer's interests, and has perfect liberty to interpret the quantities his own way; of course, with a due regard to the explanations of the former.—G. H. G.

[5656].—**Esthetics.**—I cannot now furnish a complete list, but the most important English works on Esthetics are "Burke on the Sublime and Beautiful," "Alison on Taste," Hogarth's "Analysis of Beauty," a treatise in the Encyc. Brit., Ferguson's "Enquiry into the Principles of Beauty in Architecture," Garbett's "Treatise on Design," the Earl of Aberdeen's "Inquiry into Principles of Beauty in Grecian Architecture." I may mention a few very important philosophical works on the same subject, in which esthetics is rescued from mere sentiment and explained upon physiological principles. The chief of these are by Herbert Spencer in his "Miscellaneous Essays," by Professor Bain on the "Intellect and Emotion," a treatise by Grant Allen, and only lately an interesting work by Eugene Véron, a translation of which has just appeared. Shall be pleased to furnish any particulars on the above works.—G. H. G.

[5657].—**Slaughter Houses.**—I beg to refer "J. J." to the article on "Abattoirs" in the "Commonplace Column, where information can be obtained.—A SUBSCRIBER.

[5657].—**Slaughter Houses.**—In order to render them perfectly wholesome, they should be floored with asphalt, and not with brick, stone, or other absorbent material. Claridge's patent asphalt is perfectly impervious and inodorous, but many descriptions of the so-called "asphaltes" are not so, these latter containing gas tar as an ingredient, which imparts an offensive odour to the meat. Claridge's asphalt when laid represents in appearance and effect a slate over the entire area of the floor, and it contains no open joint or inequality of surface to admit of the lodgment of offensive matter. A moderate supply of water is all that is necessary to flush the floor, which readily dries. Squeegees, now so generally used, are well adapted to cleanse floors of asphalt. Claridge's Patent Asphalt Company recommend, in order to secure perfect cleanliness, that the walls of all slaughter houses should be asphalted to a height of, say, 3 or 4 ft. above floor level.—ONE WHO HAS TRIED IT.

The Free Library Committee of the Derby Town Council have accepted the tender of Messrs. Best and Lee, of Manchester, for the decoration of the free library and museum now in course of completion from Mr. E. K. Freeman's designs. The painters of Derby held a meeting on Tuesday week to protest against the "work being given," as the placards announced, "to a firm away from the town without submitting the same to fair competition, while a great number of the painters of the town are out of employment." A motion expressing disapproval of the action of the town council was passed.

The Metropolitan Board of Works decided on Friday to make additions and alterations to the freehold building occupied by the brigade in Southwark-street, to enable it to accommodate not only the men attached to the B float, but also some of the additional men to be stationed at night in the City. The cost of the works is estimated at £1,400.

The Camborne Local Board received on Friday evening a number of tenders from contractors in Cornwall, Devon, and Somerset, for the construction of a system of sewerage for the town. The lowest, that of Mr. A. Dalbridge, jun., was accepted at £3,302 16s., and Captain Argus, town surveyor, was appointed clerk of works.

Steady progress is being made with the Metropolitan and Harrow Railway extension, from its commencement at Brompton-bury or Edgware-road, through Sheriff-green, Neu-don, and Duddinghill. The line is being carried through the latter by a cutting.

Our Office Table.

ACTIVE steps are being taken by some City people and others to preserve the churches which are proposed to be pulled down in connection with the Inner Circle Railway scheme which is to be brought before Parliament during the ensuing session. A "City Church and Churchyard Protection Society" has been formed, the committee including Lord Houghton, Mr. Beresford Hope, M.P., Sir Walter Barttelot, M.P., and Mr. Geo. Edmund Street; while in active co-operation is the Society for the Protection of Ancient Monuments. It is generally believed that the Corporation are in favour of the railway scheme, which is considered to be a public necessity, so that the efforts of the society are to be directed to that portion of the bill which interferes with City churches, in order to see whether the projected line could not be diverted so as not to destroy them. One of the scheduled churches is St. Mary-at-Hill, Love-lane, East-cheap, the line striking through the centre of the building. The bill will meet with considerable opposition in Parliament.

A NEW institution at Brighton, to be known as the Nineteenth Century Club, which has been founded and started at the expense of Mr. P. Taylor, M.P. for Leicester, virtually as an experiment to test the actual practicability of opening libraries, museums, and other places of national recreation on Sundays, was opened on Monday. The members will have the institution for their exclusive use on week days, having, besides other conveniences, the advantage of a large library of books, the property of the hon member, who lends them to the club on the stipulation that the library shall on Sundays be open in some reasonable manner to non-members as well as members. Women as well as men will have access to the club, which starts with no definite programme as a political institution. The name has been aptly chosen, for in this nineteenth century the will of the people will not much longer tolerate public museums, libraries, and art galleries being closed against them on Sundays.

An interesting paper on the "Architectural Terra Cotta at the Late Paris Exhibition," written by Mr. George Bedford, one of the delegates of the Society of Arts, appears in the *Salopian and West Midland Monthly Journal*. The following extract is interesting, and should be suggestive:—"The Ceramic Union of France was founded in 1870, between makers of terracotta and fire-clay goods, its purpose being to discover and propagate the best methods of manufacture, to consider all industrial and commercial questions which might concern the manufacturer, and to receive and give, upon as large a scale as possible, any information likely to be interesting to its members. To effect these objects it endeavours to enrol foreign manufacturers, to obtain agents and correspondents in foreign countries, to procure the advice of men of science as to the fitness or otherwise of new materials, and generally to discover and consider all that is, or is likely to be, useful in assisting the progress of the industries concerned. The results are made known by means of a journal, which is published every month, and distributed to the members, of whom there are 137, all French, except a few from St. Petersburg and Madrid. We inquired of one of our principal manufacturers how it was that there were no English firms in the society, and the reason given was that we had nothing to learn from other nations in the manufacture of terra cotta. This may be, and probably is, the case, but there is no reason why we should not learn from one another, and we venture to think that if the mutual jealousy of English manufacturers could be overcome and a similar society to the Ceramic Union of France founded in England, many improvements in material and manufacture would probably result."

It often puzzles people to know what becomes of sewage when it is applied to land in a frozen state, and Mr. J. Bailey Denton therefore calls attention to the fact that although we have had about eight weeks of continuous frost, there is no difficulty whatever in filtering sew-

age through natural soil if properly prepared for the purpose, and of securing by that means an effluent admissible into rivers. On Friday last a deputation from the borough of Dewsbury visited the sewage land at Barnsley laid out by Mr. Bailey Denton for intermittent filtration two years back, and witnessed the application of the sewage of that town, of about 27,000 population, to a comparatively small area of land which had received it alternately with another area of equal extent all the while the frost has lasted without any interruption whatever. The effect of applying sewage intermittently in a concentrated quantity on a small area of land is to keep the land thoroughly open for percolation, the temperature of the sewage being sufficiently high to thaw any ice that may be formed on the surface during the interim when the sewage is not on the land. At Barnsley there is no sub-soil water to dilute the infiltrated sewage. Hence the effluent, which has been declared by both Dr. Tidy and Professor Atfield to be well within any recognised standard of purification and quite admissible into a river, is sewage, and sewage only freed of putrescible matter.

MR. JOHN ALLISON, borough surveyor of Bradford, was on Tuesday appointed by the special committee of the Manchester Town Council to the office of city surveyor of Manchester. The salary is £1,000 a year. There were 49 applicants, and Mr. Allison was chosen out of the selected six. Mr. Allison has been borough surveyor of Bradford since 1874, and his salary was £500 a year. He has given great satisfaction by the discharge of his duties at Bradford, and will doubtless be popular and useful in Manchester.

On Thursday week, in the Hall of the Drapers' Company, the Lady Mayoress distributed the prizes gained in the competitive exhibition of fans, promoted some time since by the Fanmakers' Company, and attended by nearly 12,000 persons. The first prize, which consisted of a gold medal, twenty-five guineas, and the freedom of the company, was awarded to Miss Elizabeth Laird, of Belfast, for the best fan wholly of British manufacture. Mr. Wallace, one of the judges, stated that he had felt it his duty to recommend the purchase of certain fans for the Museum at South Kensington, where they could now be seen.

THE Bishop of Gloucester and Bristol, in his annual address, refers to the progress of church building and restoration in the diocese during the past year. In Gloucester Cathedral, he says, the work has been mainly confined to the thorough restoration of the four beautiful pinnacled turrets that form the chief feature of the nobly proportioned and majestic tower. The cost has been very great; probably each turret, owing to scaffolding and the skilled work that is required, involves a cost of not less than £800. In Bristol Cathedral the dean and chapter have resolved not to proceed with new work until all liability has been cleared away from that already done. The cost of this present completion-work has been £3,610, and

towards this all has been received but £75. When this is cleared off the dean and chapter will make a new public appeal, and solicit aid for proceeding at once with the still great work that remains to be done. A most successful service was held in the new nave last Advent, when fully 3,500 persons were present, and the question of what would be the use of the new nave was fully and finally answered. The amount of general church restoration is, perhaps, somewhat less than in former years; but this arises from the fact that so much has been done that less and less remains every year. The cases that are yet left, however, nearly all involve great outlay, and have been delayed thus long from the magnitude of the work in each case to be accomplished. Reference is made to the reopening during the past year of Chippenham, North Cerney, Charlton, King's Corsham, and Littleton-on-Severn churches, and to the works of restoration in progress at Coleford, St. Peter's, Clifton-wood, and St. Matthew's, Cheltenham. Much of the work is completed at Tewkesbury Abbey, which will be reopened in the summer. Alluding to the recent destruction by fire of the fine Church of St. George's, Gloucestershire, Dr. Ellicott urges the prudence of insuring churches to the entire value, remarking that "to introduce warming arrangements into a church, and not at the same time to insure the church to its full amount, is reckless and culpable."

THE first annual meeting of the National Association of Master Builders of Great Britain was held on the 23rd January, at the Masonic Hall, Leeds, when representatives, numbering upwards of 70, from local associations, were present. The report of the council announced a very general reduction of the rates of wages, and in some cases an increase of working hours in the various branches of the building trade as likely to come into operation at various periods during the coming spring. The meeting also discussed and approved of a form of contract which had been prepared and recommended by the council for general adoption throughout the building trades in the country, the contract being based upon the conditions of contract agreed upon by the Royal Institute of British Architects and the London Builders' Association. The association now embraces the local builders' associations of nearly all the principal towns and cities in the country, and the council are still assisting in organising new associations in towns where none exist, with a view to their amalgamation with the National Association. A strong opinion was expressed at the meeting that the proposed reduction in the cost of labour will lead to a general improvement in trade, and thus benefit both workmen, employers, and the public.

MESSERS. BENNETT AND VALON have made a report upon the electric lighting experiment at Westgate-on-Sea. Six Jablochhoff lamps were tried for four hours every night, and the average illuminating power of each lamp was found to be equal to 197 candles. From a comparison of the total expenditure with that

required for an equivalent illumination from gas, it appears that the electric lamps or Jablochhoff candles cost upwards of £23 more than would have been expended in the equivalent of coal-gas, which at Westgate is both inferior and dear. With London gas the figures would have been £7 18s. 9d. as against £40 9s. 4d. for 96 hours' lighting.

CHIPS.

The voting on the question whether the new convention respecting the St. Gothard Tunnel should be carried out—which had been referred to the Swiss people—has resulted in a very large majority in favour of the convention. This insures the completion of the enterprise.

The Ramsgate Improvement Commissioners have received upwards of two hundred replies to an advertisement for designs for the proposed marine drive to connect the East and West Cliffs.

Constantine Church, situated midway between Penryn and Helston, was reopened last week, after restoration under the care of Mr. J. P. St. Aubyn. The most important feature of the restoration is the substitution of an open roof for an old low-cabled roof. A new east window with painted glass, by Lavers, Barraud, and Westlake, has been put in, and a new reredos erected. The cost incurred has been estimated at £1,200.

At a meeting of the governors of the Harpur Charity Mr. Henry Young was appointed surveyor to the estate in Bedford. There were three other local candidates.

The Maidenhead Town Council last week accepted the tender of Mr. Kingler (the lowest received) for the execution of improvements to the town hall.

Mr. Belt, whose design for the Byron Statue was selected by the committee at the open competition in June, 1877, has now completed the clay model, and will shortly proceed to take the plaster cast of the statue.

At a meeting of the Bricklayers' Association, held at Otago, November 19, 1878, it was decided to increase the rate of wages from 14s. to 15s. a day. At a meeting of the City Council, which took place on the same date, it was stated that "it was impossible to get a bricklayer for a day or two's job for less than £1 a day."

A public meeting was held at Epsom on Wednesday week, at which it was decided to take steps to build a town hall, with a room for 600 people, and that, if possible, it be built on the open space in the centre of the High-street, steps to be taken to provide a public market. In order to raise the requisite funds a limited liability company is to be formed of 6,000 shares at £1 per share.

The tender of Mr. Alfred Robinson has been accepted by the Dean and Chapter of Salisbury for the screen of woodwork to be erected in the north transept of Salisbury Cathedral for the purpose of enclosing the apparatus for blowing the organ. The designs were prepared by Mr. G. E. Street, the architect to the cathedral. During last week workmen were employed in removing the hoarding which has long separated the nave from the north transept.

The South Kensington Council on Education have accorded a full certificate for freehand drawing, practical geometry, linear perspective, and model drawing, to one of the pupils of Mr. H. Musker, head-master of St. Barnabas Schools, North London. The boy in question, Francis James Bancroft, is only 14 years old, and great credit is due to the master for this more than ordinary success.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 7, 1879.

THE METROPOLITAN FREE HOSPITAL COMPETITION.

SCHELDOM have architects a more difficult task set them than that of providing hospital accommodation in a narrow street plot, hemmed in on two sides by lofty buildings. Such a problem has just been worked out for the Metropolitan Free Hospital Committee, who invited six architects to prepare plans for the new building proposed to be erected on a freehold site in Bishopsgate-street Without, to replace their old premises in Devonshire-square. The architects invited to submit designs were—Mr. Charles Barry, President of the R.I.B.A., whose acceptance must have surprised those who remember some recently-expressed opinions of his on competitions, Mr. Chatfield Clarke, Mr. H. H. Collins, Mr. James Edmeston, Mr. E. P. Owen, and Mr. Ebenezer Saunders; and the committee, in compliance with the advice of the Royal Institute of British Architects, submitted the drawings to Mr. Edward P. Anson, who has acted as assessor, and whose recommendations have been, we believe, unanimously adopted.

The result of Mr. P. Anson's report is that the design with motto "Ad Rem" has been placed first in order of merit, the authors being Mr. H. H. Collins, of Old Broad-street, E.C., and Mr. James Edmeston, of Great Winchester-street, E.C. By a singular coincidence, the second best plan, under motto "Civis," in a red lozenge, has fallen to the same gentlemen—Mr. James Edmeston and Mr. H. H. Collins, who have jointly sent in both designs. The most important conditions imposed upon the competition had reference to the areas for light and air, which made it almost necessary to raise the building to a greater height than necessary or desirable. Half Moon-street, which forms one boundary, is contracted, and necessitated the setting back of this front—a circumstance which some of the competitors have availed themselves of. Another important condition was the requirement of distinct entrances to the out-patients' waiting-rooms, and a separation of this department from the hospital. One of the greatest difficulties in the way of a perfect plan is the great notch in the site made by "Paul Pinder's" house—a relic of Old London it would be almost a pity to sacrifice. Moreover, a limit to the height of building was imposed of 73 feet, and this in some cases has been met by sinking the out-patients' waiting-rooms, and in one case by a wider area. Altogether we may congratulate the committee on having obtained such an ingenious set of plans for a site which offered unusual difficulties.

Looking over the design "Ad Rem," we cannot fail to observe a well-considered, if not clever, plan, in which the authors have certainly made the most of a very difficult and cramped site, and the conditions imposed. The agreement entered into between the Committee and the Great Eastern Railway Company made it necessary to curtail the building area. It compelled certain areas for light and air, and we find the authors have judiciously met these by providing areas on both sides of the wards, partly by setting back the frontage in Half Moon-street. By these means also a greater height of building is possible, as the angle of light as regards the opposite buildings is not encroached upon. We find the basement plan provides for the dispensary in the rear of the site, and is approached by stairs from the side street area. It is lit by a sky-

light and court. The position seems convenient of access from laboratory and the ground-floor. The kitchen, offices, and stores have a long corridor entrance which appears ill lit—at least we do not see provision for lighting it. The ground-floor is economically planned; the waiting-rooms for male and female out-patients are separated by two respective consulting-rooms, have their own entrances, and are lighted from Half Moon-street. A long corridor brings them into communication with front hall and stairs, and this is lighted by skylights. The front is occupied by the surgeons' and porters' rooms. The accident ward is convenient to the surgery lift or staircase. We observe the upper or ward floors have been planned on the pavilion system. On the first floor there is a large female-ward, 98ft. by 23ft., for 24 beds, lighted and ventilated on both sides, and giving 1,500 cubic feet to each bed, these being ranged along the walls between windows. This ward occupies the main rear portion to Half Moon-street, and is well approached by stairs and lift, nurses' room and scullery being at the same end; and we may here remark upon the great importance of having the nurses' rooms near the stairs and lift as an element in facilitating the service. There is one feature in this plan that gives it a decided advantage over others, and that is the isolation of the w.c., lavatory and bath-rooms from the ward. These on each floor project and occupy the area on west side of ward, and are approached from each ward by a lobby or passage, cross-ventilated, so as to shut off all risk of contamination. The front room of this floor is a board-room and Secretary's office. The second floor has two wards, each 38ft. by 23ft., divided by a children's ward and nurses' rooms, and these are appropriated to Jewish patients. The corridor along the side is supported and forms an iron-covered balcony, by which means light and air are obtained below for the female ward, &c. At the Bishopsgate end is a convalescent ward. The third floor has another long ward for 24 beds, and follows the female-ward; the surgeon's sitting-room is in front. The fourth floor is a repetition, while the kitchen and bedrooms and operating-room are on the top floor. The chief points in this plan is the central and convenient position of the stairs, lift, and nurses' rooms, and the detached position of the latrines, making each ward independent, and practically isolating it as much as possible from the administrative portion. Speaking of the kitchen offices, the authors say in their report, "With respect to placing the kitchen offices on the upper floor, it is not recommended, although provided. It will occasion additional service and expense, whilst its advantages are exceedingly doubtful. For example, it will necessitate having a special domestic to receive the goods and to give orders, and will require a double and constant supervision, whilst every article of food will have to be conveyed by means of the lift to the upper floor." Facility of transit in the food is certainly hindered by this roundabout mode; but the question is whether the funes of the culinary operations can be effectually cut off from the wards otherwise. The details of this design are certainly well studied; the windows are "hopper," the top easement falling inwards. Cold air is admitted by flues at the top of the building, so as to get it free from impurities, thence passing over coil pipes into the wards, and we see also air ducts under the ward windows are shown opening into the ward at the sides. Galton's stoves are used besides coils in the window recesses for warming; Verity's exhaust apparatus is proposed to extract the vitiated air; the wards are intended to be finished in silicate enamelled paint, with doweled floors, while Pearson's apparatus without traps, and other sinks and lavatory fittings of Bower's and

Jenning's manufacture are specified. We notice also Pott's Edinboro' traps and Banner's cowl to the said pipes. In design "B" the wards are crosswise with end windows, and the whole of land is utilised, but the planning is less effective. In style, the architects have chosen Italian of a very used-up type toward Bishopsgate-street, contrasting poorly with Sir Paul Pinder's house. The elevation is altogether unworthy of the plan, and we believe the architects will be requested to remodel this portion of their design. The estimate has been worked out at 9d. a foot cube to £18,000. The next design "Civis," in a lozenge, placed second, has undoubted merits, but the authors have disposed their wards (L-shaped) on each side of a central stairs and lift towards the side street. An area is left on both sides. The ground plan has the out-patients' waiting-rooms facing Half Moon-street, with entrances on each side of a centre vestibule, and lift and a porters' room reached by a few steps descent from street level; in front is the administrative department, accident-room, &c., while on the inner side are consulting-rooms, approached by a corridor from the front, in which we find steps, certainly undesirable. The basement contains the nurses' and housekeepers' rooms, cellars, dispensary, and laboratory in communication. On the first floor the wards, as noticed above, are placed on each side of the stairs and lift; the lavatory and w.c.'s occupying a front bayed projection towards the side street, and the nurse has also in this central division a room which commands both wards. There are twelve beds in each ward and separate sets of lavatories to each. The arrangement at the bend of site, between wards and front department, is somewhat confused, and is, perhaps, the least happy part of the plan, though economy of service and good lighting have been kept in view. On the second floor there is a convalescent room, facing Bishopsgate-street, with balconies; and the windows of this elevation, particularly the recessed bays of this and the first floor, are excellent features. The wards are devoted to Jewish patients, ten beds in men's ward, eight in the women's, and six in the children's ward, with small rooms for acute cases. The third and fourth floors have each two general twelve-bedded wards, arranged as on the first floor, kept separate by the intervening stair and lift, nurses' room and lavatories, and a mezzanine floor of two rooms is provided over one set of these conveniences on each floor. The sitting-room and bedroom of the house surgeon, matron's rooms, &c., are placed in front, while the top floor is devoted to servants' rooms, kitchen offices, operating theatre, &c. As in the first plan, the authors show an alternative basement arrangement for the kitchens. We notice, too, that 100 cubic feet of additional space has been given to each patient by this plan, 1,200ft. being the specified minimum. Generally the private entrance and official part have been kept distinct from the hospital proper; the communications are good, and the wards well separated and lighted. The waiting-rooms and their respective conveniences are also distinct and under the porter's eye, and on the whole the authors have closely followed the conditions. The elevation towards Bishopsgate-street is boldly conceived, and in architectural merit must be placed before that of "Ad Rem." The recessed bays in shallow cants of the principal floors, the open loggia entrance, and the pedimented superstructure form a dignified front not wanting in character. The style is Italian. We do not like the unsupported ends of the entablature, which appears to finish unsatisfactorily. The side elevation is spoilt by the number of small windows. The estimate is £18,000.

We may make a few comments on the unselected designs, and of these one under a

Hebrew motto, "I will heal" (Mr. E. Saunders) has some good points in planning. This remark applies, however, more to the upper floors than the ground floor arrangement. The glazed partitions between the waiting-rooms and corridors are objectionable. The entrance from Bishopsgate-street is on one side, leading to an awkwardly shaped hall and staircase, with a long corridor approach. The rear portion of site above is occupied by large wards, 69ft. by 30ft., for 30 beds, a double row being placed down middle of the ward in addition to the side rows. The wards are lighted on both sides in Half Moon-street, and by an open area, but the stairs and landing are awkward, and the w.c.'s are attached. The first floor arrangements show the surgeon's rooms in front, and on the second-floor, the front room is made a convalescent ward. The external treatment is in a poor pseudo-Gothic dress of late character, and the side elevation has a too warehouse look. Another well-studied arrangement, though not faultless, is "Experientia." On the first-floor plan is a long corridor, lighted by area and ceiling lights, the wards placed lengthwise to Half Moon-street, but no cross current is obtained, although we observe in the plans provision for air-ducts in the inside walls. There is one front ward for 9 beds. The position of the doctor's rooms in the rear portion is objectionable, and the closets and lavatories are not arranged upon the best principles. On the other hand, something must be said for the arrangement; there is a studied regard for light, the hall entrances and stairs are spacious. In elevation, the author (we believe Mr. Chatfield Clarke), has given something dignified and suitable in which open fenestration is the main feature.

The author of "Civis" (we believe Mr. Charles Barry), places his male and female out-patients in the rear, divided by a serving dispensary in an economical manner; the surgery, consulting and dressing-rooms are also conveniently planned; but there is a highly congested and crowded look in the centre part between hall and stairs, and the waiting department, the lavatory, w.c., &c., are rather confused, and the wards are not well lighted or ventilated, especially the cross one. The administrative arrangements cannot, on the whole, be pronounced satisfactory for economical working. In external design, a tawdry kind of Italian has been adopted much more fit for the front of a warehouse than a hospital. "Proof," by Mr. E. Parry Owens, shows a sub-ground-floor arrangement; there is a good division of out-patient's entrances and exits, the dispensary is placed in front, with a large waiting lobby. Above, the wards are arranged on both sides, one along Half Moon-street, and the other on the left, rather poorly ventilated. There is a plain, dignified elevation, chiefly in brick, in a species of moderate Queen Anne, facing Bishopsgate-street, but the side front is not happy in its roofs. On the whole, it is one of the best sets of drawings, and the details are carefully considered.

Since we inspected the drawings, we have heard that it is the intention of Mr. E. P. Owens to protest against the award, on the ground that the two competitors whose designs have been placed first and second had no right to combine in the manner they did to send in two designs. We believe Mr. Owens' contention is that the second plan sent in by Messrs. Edmeston and Collins ought to have been submitted as an alternative design under the same motto. We cannot see that the objection is worth much consideration.

At Wincanton police-court, on Monday, a Bruton solicitor was fined 30s. and costs for assaulting Mr. Thomas Pike Davis, architect, of Taunton, when in a hotel at Bruton.

ENGINEERING AND ART.

IF it has been found somewhat difficult to draw a line between engineering and architecture, or to discriminate where the one ends and the other begins, it cannot be surprising that the same difficulty meets us in defining the separation between engineering and art. Mr. Charles H. Driver, F.R.I.B.A., in a paper read by him before the Civil and Mechanical Engineers' Society last week, selected the heading to this article as the subject of a discourse; and as the theme is one of considerable interest to both professions, we may here consider the argument broached by the author. Mr. Driver divided his subject under three heads: 1st.—What is Engineering? 2nd.—What is Art? and 3rd.—Are Engineering and Art of service to each other? and can they be united? It is, of course, absolutely necessary, before discussing such a theme, to define the terms, and the author has done so by designating Engineering as the "science of construction," and "Art as the result of the endeavour of the human mind to achieve the perfection of beauty, whether it be in form, colour, or sound." We cannot quarrel with the definition of engineering, but to that of art we may take an exception, inasmuch as it appears to exclude construction and all idea of utility—in other words, an object for the exercise of art. If the definition had run: "Art is the result of the endeavour of the mind to achieve perfection in form, and colour, and sound by adding a sense of pleasure to that of adaptation," it would have been nearer the truth, for the great error which has overtaken most of the older writers on art is that of making it something quite distinct from use, and therefore something that can be acquired without reference to the useful. The great barrier between engineers and artists—the hiatus, or want of art Mr. Driver and everyone else must deplore in the work of the engineer—has arisen mainly from the engineer not considering art as the perfection of skilled adaptation rather than as something that may be added to, or taken from, it. The modern divorce, too, between use and beauty has been increased by the imperfect education of artists, for in the days of Egyptian, Greek, and Mediæval art no such separation existed, nor indeed was possible between scientific and artistic construction. Well may Mr. Driver point to the engineers of antiquity who constructed works of pure utility such as canals and embankments, aqueducts, roads, and bridges, which are now regarded as triumphs of architectural art. They were in fact, architects, the utility of their construction being in truth the fundamental principle of their success. There was no such a thing as engineering, in the modern sense of the word, in the days when Amiens and Salisbury Cathedrals were reared; when our old parish churches, which architects love to copy and sketch, were built. The divergence was commenced long ago, since, in fact, men ceased to bestow thought upon their work.

Mr. Driver again says, "Art in the abstract may be considered to be that which gives pleasure to the purely mental faculties, as opposed to the purely animal passions." And this view of it accords with the fact that the pleasures afforded by art are the least selfish and monopolising. Thus the pleasures of eating and drinking, and of other like corporeal appetites, are essentially monopolist pleasures; they are limited to the individual, but the beauties of art in music, painting, architecture, and sculpture, can be universally admired and enjoyed—they give pleasure to all. The author refers to the organs of sight and sound as the two mainly concerned in the æsthetic sense. The sense of "fitness" is an artistic pleasure; it produces an agreeable feeling of ease and absence of restraint, and to this source the

satisfaction of ample support in architectural construction is due. On this head the author follows, perhaps unknowingly, the recent theories of those who base æsthetics on physiology, though this division of the subject might have been amplified with advantage by reference to the theories of Spencer, Professor Bain, and many German and French writers on æsthetics, who prove conclusively the dependence of all our emotions upon the nervous organisation. The value of the principle of unity in comprehending under one simple figure, such as a triangle, circle, or square, a host of individual parts or particulars, was usefully dwelt upon by Mr. Driver before a body of engineers who, in their work, frequently fall into the mistake of multiplying detail to the complete confusion of the sense, and to the utter loss of all comprehension of plan or design.

Passing to the more practical division of the author's paper, namely, whether Engineering and Art can be united, reference was made to the service engineering has rendered to art, and Mr. Driver made a just remark that when engineering does not benefit art, it is because it has been wrongfully and improperly applied. We have, on previous occasions, argued on behalf of the same proposition, and it might be proved conclusively that every unsatisfactory work of engineering, every ugly bridge and viaduct, exhibits an imperfect or wrongfully applied principle of scientific construction. The paper dwelt upon the benefit engineering has been to art in the work of printing and engraving by the multiplication of copies, though there are a few artists who would join issue with the author upon this point. Again, in the manufacture of porcelain and glass, metal work and textile fabrics, much is due to engineering appliances, though the same exclusive and anti-liberal view of art may be held by some. In considering how art reciprocates the benefits she receives from engineering, the author pointed to the early influence of art upon engineering, which taught builders to give a gentle taper and swelling, or entasis, to the column, and to clothe the temple with beauty, and to the subsequent throwing over of art as the controlling power and master. While engineering acknowledged the master hand of art, all went well; but when modern engineering throws off the yoke of allegiance, the result has been chaos as regards art, we would rather say as regards both. The author says, and we quote this part of his paper—

The modern engineer seems utterly to ignore beauty of form; if he has to use a vertical support, he will probably make it of the same thickness all the way up; if he wants a buttress, he will put a great lump of masonry or brickwork in, without thought as to whether it will look ill or well, but calculated, I grant you, to do to an ounce what it has to do; there is an immense amount of thought in their work, but no mind,—I mean in an artistic sense; and even the thought they give to their work is of a sordid kind; for while they study how to use their material economically, they omit at the same time to study how to make their work pleasing, thus leaving half their work undone.

I admit that engineering possesses a strong point of affinity to art in its *truth*, and by this I mean the honest construction employed by engineers in their work, never disguising or hiding it, but letting it be plainly visible to all; and there is a good honest purpose in what they do, and the sentiment of reality and truth as opposed to fiction and falsehood, appealing as it does to our practical urgencies, disposes us to assign a high value to every work in which truth is strongly aimed at, and to derive an additional satisfaction in work in which fidelity of rendering is induced upon the charms peculiar to art. But while we admit and admire the truth of the engineers' work, and give them their due meed of praise for what they do, we must not forget at the same time to blame them, in that they leave so important a part of their work undone—viz., the making of it artistic. In my mind it is very nearly of equal importance that a building, a bridge, or whatever it may be, should be of good form and pleasing to the eye, as to be strong.

There is an impertinence and brutality and want of regard for the feelings of others in many of the

erections of late years—the work of modern engineers. Consider how the Thames at London has been maltreated, and I ask you, as reasonable men, what right have we to inflict on ourselves and future generations such awful examples of the selfish disregard of all that is beautiful as have there been perpetrated? Our forefathers left us, their successors, works of beauty. What shall we leave our successors!

While there is much truth in the remark that modern engineering is often brutal, or we would rather say, impolite and uncivil in its uncouth blunt honesty, we cannot agree that its forms are always the most truthful or economic, and we may cite the usual rectangular iron girder and the straight-lined iron column as instances of wasteful and imperfect adaptation.

In answer to the question whether engineering and art can be united, the author says, Yes, and by means of architecture, and proceeds to show how. "Engineering is the science of construction; architecture the art. Engineering is the hard, matter-of-fact, uneducated man of business; architecture, the cultured and polished gentleman. Architecture is educated engineering." The picture drawn of the modern engineer and architect are true: one is bold, truthful, hard, and inconsiderate; the latter, timorous, uncertain, and considerate of the feelings of others, with a desire for the beautiful, often failing from lack of power. He is "bounced and bullied out of his place by the engineer," and the author adds, much that the engineers have done should have and would have been better done by architects if they had but retained their position and kept themselves abreast of the times. In contrast with these sketches, the engineer and architect of old were one and the same individual—honest, bold, with an intense love of the beautiful. The old architect did not require the aid of the engineer in his foundations, nor did he beg the aid of anyone to touch up with a bit of gold and a few gilt bosses his bridge to make it presentable. Mr. Driver says if we are ever to hope for a reunion of engineering and art we must begin by merging the architect and engineer into one. Some apposite remarks were quoted from "Chambers's Encyclopædia" to prove that architecture truly embraces both the scientific and artistic sides of construction, and the author concluded by showing the difference in the way an engineer and an architect at present would set about the same work. The engineer would study his structure, and calculate his material to a nicety, place his doors and windows where wanted, in total neglect of artistic distribution, stick his ornament on here and there, put mouldings, not unlikely upside down, making them ridiculous; while the true architect would combine the common sense and economy of the engineer, but place his doors and windows in their most useful position, with a view to a pleasing result. Mr. Driver says, architects as a body have a far greater knowledge of practical engineering than engineers have of architecture; the "architects' failures being as nothing to the engineers' failures in art." He refers in terms of commendation to the work of the mechanical engineer in observing the rules of art, and in refusing to use Greek Doric columns for supporting the beams of engines.

Now, the author has, perhaps, rather begged the question in saying that it is by means of architecture art and engineering are to be reconciled, though it is probably the point of contact between the two professions. It is at least rather "arguing in a circle," as the logicians say, to contend that art and engineering are to be united by engineers becoming architects, or vice versa. We think the proposition sought to be established would have been better accomplished by showing the utter disintegration in the modern education of architects and engineers, and the means to be adopted in making

art instinct again take its position as the controlling impulse of the faculties employed in engineering. Until it can be clearly seen that every engineer is an uncultured artist, and every so-called architect an imperfect adapter of his materials, it will be of little use to merge the two professions. The subject is, after all, one of education: when the artist begins to find out that the pleasing effects he produces in form and colour are all derivable from impressions produced on the nerves of the eye, and when the engineer learns that his formulæ and constants are, after all, but clumsy approximations to truthful science, and that his theory takes no account of the thousand other factors of which he is supremely ignorant, there may be some prospect of a reunion between the temporarily divorced elements of engineering and art.

FINE ART EXHIBITION AT THE ROYAL ALBERT HALL.

AN exhibition of works of modern artists has been opened at the Albert Hall this week, though for what object so fashionable a locality should have been chosen, and why the Albert Hall should be turned into a fine art gallery for the sale of works of art it is not easy to imagine. To say the least, a sixpenny exhibition of pictures in so select a quarter seems hardly compatible with the original purpose of the hall. In opening the small catalogue sold at the doors we find it stated "a commission of $7\frac{1}{2}$ per cent. upon the prices quoted will be charged upon all works sold through the intermediary of this exhibition. Pictures disposed of directly by the artists themselves or through private agencies will not be exempted from payment of the conventional commission." Again, it is made known that "artists disposing of their works independently should at once announce the fact to the manager, otherwise an overt sale effected at the Exhibition will be held to take precedence over a private sale made by the artist, &c." Are we to understand by these conditions of sale that the collection now on view has been got together primarily for the purpose of sale? for if so the exhibition at once loses its ostensible character as one for the display of fine art works, and must be classed with the galleries of picture dealers and bazaars. And we may, in passing, enquire into whose hands does the $7\frac{1}{2}$ per cent. commission fall? Many of the works exhibited—or offered for sale—whichever it is—are not new to us; for instance, we see Mr. Keeley Halswelle's fine picture, hung a year or two back at the Royal Academy, entitled "Non Angli, sed Angeli" (3), portraying Gregory the Great in the market-place of Rome taking notice of the British children lying at the foot of some temple, the pitiful and pathetic countenances of whom called forth the well known inquiry of Gregory and his reply, "Call them not Angles, but angels." We see the price affixed to this picture is £800. The Queen lends a few fine works. "The Princess Doria Washing Pilgrims' Feet," by Sir D. Wilkie; "Studio of Sir Francis Chantrey," by Sir E. Landseer—the latter one of the cleverest of the artist's works. It represents a dog seated on a table covered with a red cloth, intently watching his master's interests; a cat at one corner, peeping through the partly uplifted table-cover, being the unsuspected cause of the dog's attention. "Dives and Lazarus" is a bright piece by Mr. T. Thorneycroft; but one of the finest subjects in this part of the gallery is "The Feigned Death of Juliet," by Sir F. Leighton—a grand painting, powerful in its dramatic interest, and one of the best probably ever painted by the President of the Royal Academy. A fine and impressive sea picture is Mr. J. Brett's "Christmas off the Irish Coast" (48), admirably painted in the red glow of the upper clouds and the reflec-

tion in the deep trough of sea. Mr. E. Armitage, R.A., is represented in the "Cities of the Plain," and Mr. A. J. Woolmer in the "Pre-Adamite Earth," both impressive subjects. The latter is valued at £500. Amongst many other mediocre works are two by R. Lehmann; a luminous face of the Virgin, by C. L. Desanges; a clever painting of a child in a cradle, watched over by an elder sister (5); "View of Amsterdam" (37), by Ludwig Hermann; a finely painted portrait of Mr. Geo. J. Holyoake, by W. Holyoake; and two admirable studies called "Destitute Children in London," showing the effects of a timely rescue from vice, in contrast with which is another picture of juvenile faces, "Delighted with the Gallant Pageant," by P. Hoyoll. "Sanctuary" (67), by Mr. A. D. Lancaster, is finely painted, the attitude and penitent face of the woman at the threshold of the door is pathetic and moving. "Untrodden Snow" (118), by A. MacCallum, is another old face representing the fine cedars and birch at Holland Park. Mr. J. E. Clayton, in "Birds of a Feather" (121), has given us a rather figurative treatment clever in drawing. We note also a few admirable fruit and flower pieces, Nos. 143, 150, 153, 158, 151, 156. The expression of faces in 172 in the light of gas-lamp, the office and surroundings, conspire to render Mr. W. Weekes' able picture of the "Foolish Son," a powerfully-told incident of domestic trouble. We cannot pass by Mr. MacCallum's "Cedar Grove, Chiswick," or the grand beech in Mr. W. B. Brown's picture entitled "Beechwood in Autumn." Mr. W. G. Daffarn has given us a simple reminiscence of the country in "Hours of Idleness"; the girls are well drawn, and there is a natural summer glimmer or misty light over the corn-field that reminds us of a hot day. Very touching and true to nature is "The Dark Cloud" (274), by E. C. Girardot, in which a young girl, overworked at her nightly toil, is overtaken by sleep, her head resting on a small table; the meagrely-furnished room, the cup and half-loaf, the candle burning low in its socket, and the mouse on the floor tell their own tale too powerfully to be misinterpreted. "A Belle of the Last Century," dressed in open stomacher, in the green brocade dress of the time, is a cleverly painted subject. Very clear and sparkling in tone is Mr. J. Vivian's "End of Grand Canal, Venice" (285); while for study of character Mr. Ludovici's "Singing Lesson," (304), must be awarded praise for the pose of the young maidens, and the rendering of the accessories. No. 313, "A Child of Newgate," by S. M. Louisa Taylor, might draw a tear to the eye in the touching penitence of the convict, and the sympathising expression of the sister of mercy. Portraits of Captain Sir F. Leopold M'Clintock, Captain Sir G. S. Nares, Captain Sir John M'Clure, and other Arctic explorers occupy conspicuous places in the gallery. "Westminster from Lambeth-bridge" is a fine subject for the architectural painter, and Mr. J. O'Connor has chosen a good point of view, and given us the soft haze of an August morning, and a slimy river bank; but the clock-tower of the Parliament Houses is defective in proportion. Few will not be struck with a droll picture of a little girl clad in black velvet, with a lace cross-over, apron, and red sash, with countenance of a most demure kind, a floriated screen being the background. It is by Maria Brooks.

Mr. J. Barker's "Scotch Cattle," and Mr. J. Richardson's "West Highland Cattle" are fine paintings of Northern breeds. "Elaine," by M. Burnham Brook; "A Saint's Day in an Italian Church," "A Young Heart and an Old Shoe," by H. M. Vos, jun.; some fine Swiss scenery (359, 361); "Evening on the Coast," by Caroline F. Williams (381); No. 387, "Girl at Window," an Oriental theme, clever in its painted glass and warmth of light, by R. Gavin. The

"Sleep Walker," "An Idle Housemaid," (404), by P. A. Fraser, "Amor Vincit Omnia," an allegorical picture by Walter Crane; "Crossing the Styx," by F. A. Hopkins; 443, "Lake Thun," grand rose-tinted mountain in the glow of sunset, by Mr. W. S. Morrish, are a few other pictures that are worth noting.

We cannot say much for the water-colours, though there are a few pieces of merit, amongst which are "The Matterhorn," by W. Croft; "The Eiger" (465), by J. W. Smith; "Tomb of John Mark, Evangelist in St. Mark's, Venice," a splendid blending of coloured marble, by J. Bunney; No. 529, "A Study of Pottery," in which the soft colouring and reflected light are skilfully handled by B. W. Spiers, and a few architectural subjects, notably No. 486, "Cloisters of Magdalen College, Oxford," by G. R. Clarke; "Rouen Cathedral" (587), by S. J. Hodgson; another Continental sketch at Rouen, by J. R. Barraud (589), and a pleasing sketch of the Church of St. Wolfran, Abbeville, by J. D. Barnett. In the west gallery we note No. 621, a sketch, by L. Lewis; No. 644, "Interior of St. Mark's," by Mr. Hodson; No. 679, "Llantony Abbey, Monmouth," by H. R. Cauty; "A Street Scene," by G. R. Clarke (670), &c. The etchings, engravings, and autotypes are not numerous; we may note an etching by L. B. Phillips of the Canal, Bruges; a charcoal drawing of ducks "on the wing" by G. E. Rischgitz; a few admirable engravings by R. Josey, J. Ballin, A. Blanchard, &c.; and some capital autotypes by the Autotype Company. The paintings on china plaques &c., cannot be called, on the whole, successful works of the kind. There is too great a disposition manifested on the part of the artists to produce pictures rather than suitable modes of decoration. Allegories, classical myths, and fruits and flowers constitute the chief means of ornamentation, and the best works are those with a Japanese motif. No. 803, "Romola," by E. Havers, is a cleverly adapted head with conventional background. A large plaque, set in ebony frame, by Mr. J. Sparkes, is the most striking and perhaps tasteful instance of china painting. It represents a maiden with a little girl forming a daisy chain. The flower background of daisies makes a pleasing conventional relief, and the colouring and drawing are not heavily done, but are in simple outline with light flat tints. The mistake in many of the productions is over-finish and relief, while that decorative character appropriate to ceramic subjects is ignored. "The Gamblers," after Meissonier, by L. Hall, illustrates the latter mode. One of the best examples of foliage treatment is Miss Edith Croper's "Purple Clematis"—a rich blue spray on white ground, in a Japanese style. Some decorative tiles, with birds and pear blossom, by Augusta M. Reid; "The Mermaid," by J. Cole; dessert plate, by B. A. Louis, "Autumn Brambles" (877), "Conventional Apples" (879), by J. Edith Cowper, and "White Passion Flowers" (880), by Florence Cowper, are all pleasing specimens of ceramic decoration. We have no room left to say anything upon the paintings on ivory and miniatures, many of which will repay inspection. In wood carving Mr. T. Colley sends a panel carved in limewood after Gibbons, and an oak frame. The style of the Adams is shown in a frieze, eboused and gilt, by Mr. W. M. Holmes, and a mahogany frame, by the same artist, both unique examples of execution. Some well-modelled terra-cotta busts are also to be seen in the collection, the names of J. Bell, Marshall Wood, Thorneycroft, J. Edwards, Eli Johnson, Callcott, and other artists being among the contributors.

The paintings, drawings, and designs executed by the students in the Great Yarmouth School of Art were exhibited last week and were well patronised.

ARCHITECTURAL GEOLOGY.—III.

OOLITIC OR JURASSIC FORMATION.

THE term "Oolitic" is applied to the series we are about to describe, on account of the peculiar character of the limestones which form its distinctive feature. These are composed of small round particles of calcareous matter, cemented together so as to resemble, when examined by a magnifier, the appearance of a mass of eggs or the roe of a fish, hence they are often known by the name of *roe-stones*; when, however, the particles are as large as a pea the stone is termed "pea-stone," or "Pisolite." All these limestones are full of marine shells and other organic remains, and are interstratified with sands and clays. From the circumstance of these strata being developed in the Jura range, between France and Switzerland, the term "Jurassic" is commonly applied to them, including, however, the "Lias" beds, which are usually found immediately below the Oolite. In this country the Oolite is a very important formation, as the greater part of our building stones are obtained from it. There are four principal divisions of the formation in England: (1) the Upper or Portland Oolite, (2) the Middle or Oxford Oolite, (3) the Great or Bath Oolite, (4) the Lower or Inferior Oolite, which overlies the Lias.

Portland Oolite is so named from the fact of its greatest development occurring in the Island of Portland, from which the best Oolitic stone is obtained; the quarries being worked in all parts of the island, and those on the north-east yielding the best quality, while the worst is found on the opposite side. The hardest and most durable stone is the "Roach," found near the top, but, as it contains numerous cavities left by shells, it is not so suitable for architectural purposes as the bed that comes directly below it, and called the "Whit bed," which is of a light brown colour and generally known to London masons by the name of "brown" Portland. Lower down in the quarry we come upon softer and whiter stone, which is much used by builders on account of its being easier to work than the "brown," but its crushing-strength is less by one-fourth, and, being of a more absorbent character, it is consequently more readily acted on by frost and weather. Portland stone contains 95 per cent. of carbonate of lime, with a small quantity of silica, magnesia, iron, and alumina. As a full account of this stone has been given in the BUILDING NEWS for June 12, 1874, we shall not enlarge further on the subject at present, but refer our readers to that article. The beds of this formation are found in other parts of the country, being worked for building stone in the counties of Bucks and Oxford, near Aylesbury, Headington, Garsington, and Great Haseley; at the last named place there is a bed 8ft. thick of white limestone resting on a sandy oolite. The Pendle stone found near Aylesbury is a soft calcareous sandstone. At Swindon there is a stratum of limestone 8ft. thick, with beds of hard calcareous sandstone. In the neighbourhood of Chilmark and Tisbury in Wilts we find a silicious limestone of very excellent quality, some of which is equal to the best Portland as a building material. At Sherborne, in Dorset, a sandstone is quarried for building purposes in this formation.

Purbeck Beds, so called from being developed in the Isle of Purbeck on the Dorset coast, belong to the Upper Oolite, and consist of fresh-water limestones and clays, attaining a thickness of 300ft.; the hard shelly limestone called "Purbeck marble" is obtained from these strata. The Purbeck beds are found in other parts of Dorset, as at Wareham, Kingston, and Darleston Bay near Swanage, also at Tisbury and Chilmark in Wilts, the stone procured from Chilmark

being used for roof tiles in the neighbourhood.

Middle Oolitic strata consists of sands, clay, and Oolitic limestone, of which the upper beds called the "coralline" are well developed in Dorset, being 250 feet thick near Weymouth; and a fine-grained freestone is obtained from quarries at Todbere, near Bruton, Marnhull, and Gillingham. In Wilts a building stone is quarried at Purton, near Swindon, and a calcareous grit at Seend. A Pisolitic stone is found near Steeple Ashton, and a superior quality of lime is obtained from the stone of Westbrook, near Melksham. In Oxfordshire there is a 12-foot bed of Oolitic stone in the Headington quarries, which has been much used in buildings at Oxford, as well as the stone procured from Wheatley. The lower beds of this formation are known as the *Oxford Clay*, a dark blue, yellowish or slaty-coloured clay, in which selenite and septaria are found and occasional layers of calcareous sandstone; it is worked largely for the manufacture of bricks and tiles at Peterborough, Oundle, and several places in Dorset, Wilts, and Gloucester; it is not a water-bearing stratum, and must be pierced if water is to be obtained.

Great or Bath Oolite.—This division contains large quantities of excellent freestones in great request for architectural work, together with beds of shelly limestone or rags, clay, sand, and flagstones. It ranges through parts of Oxford, Northampton, Lincoln, Gloucester, Wilts, and Somerset; what is termed Bath stone being procured from the Downs of North Wilts between Bath and Chippenham, where it is quarried by tunnelling into the sides of the hills; when found in the quarry it is soft and moist, almost crumbling at the touch and having a yellow tint, but after exposure to the air it gets white and hard as it dries. The "weather" bed, which is a brown shelly limestone, is best for the parts of a building which are most exposed to weather, but the "scallop," which has a fine texture and is of superior quality, is more suitable for carving and moulding. In the neighbourhood of Minchinhampton, Gloucester, and other parts of Gloucestershire, there are extensive quarries of Oolitic stone, and a sandstone is found at Burley, near Cirencester. The Great Oolite is also largely worked for building stone in the counties of Northampton and Lincoln at the quarries of Barnack, Casterton, and Ketton, near Stamford; Haydon, near Grantham; and Aneaster, near Sleaford. Limestone for building is obtained at Kettering, and a ragstone at Stanwick, near Higham Ferrers. A hard crystalline limestone, which takes a good polish, and is called "marble," is procured from the quarries of Alwalton, in Huntingdon. The Oolites of Aneaster, Bath, and Ketton are remarkable for the complete absence of silica in their composition, which is from 92 to 94½ per cent. of carbonate of lime, with 2½ to 4 per cent. of carbonate of magnesia, and a small proportion of iron and alumina. The stone of Aneaster weighs 139lb. to the cubic foot, that of Ketton 128lb., and that of Bath 123lb.

Forest Marble consists of a series of oolites, clays, and sand, which are chiefly found at Wychwood and Bladon in Oxford, and at Fairford, Chavenage, Milborne Port, and Wincanton; its chief value consisting in the thin flagstones and roofing slates which are procured from it. In some places, however, as at Long Burton, near Sherborne, it is hard enough to be polished as marble; it is also quarried for church-building purposes at Wormwood in Somersetshire, and at Alworth, in Wilts; at Bearfield, near Bradford in Wilts, a firestone is obtained. Beds of clay are found in this formation at Bradford-on-Avon and also at Scarborough in Yorkshire, where they are worked for making drain-pipes and tiles.

Cornbrash is a term applied to a bed of stelly limestone which occurs near Woodstock, and is used for walling and for burning into lime.

Stonefield Slates are thin flagstones obtained near Woodstock, and much used in Oxfordshire for roofing and paving purposes; and at Charlbury a sandstone is quarried which has been much used for buildings in Oxford.

The Great Oolite is quarried at several places in Somerset—being obtained near Taunton for building stone, and at Holcombe for paving; the quarries of Montacute and Bridgewater yield a sandstone used for building. In Oxford a brown shelly Oolite for building is found at Tainton, near Burford, weighing 136lb. to the cubic foot. In Northampton we find a sandstone at Blisworth, Rockingham, Oundle, and Wellingborough; and a limestone near Northampton. In the north-east of Yorkshire, this formation yields a light-brown sandstone at Aislaby, Newton-dale, and Sneaton, near Whitby, weighing about 126lb. per cubic foot, which is much used for local buildings; a freestone is also found at Oswaldkirk, near Gilling; and, at New Malton and Brough, a sandstone for building is procured, that from Brough having been employed in Beverley Minster. Below the Great Oolite in Dorset and Gloucester a bed of sandy clay occurs which is called *Fuller's earth*, from which copious springs of water can always be obtained.

Lower Oolite.—In this division we find sandy Oolites combined with beds of compact limestone, quarries of which are worked in the south-west of England, the north of Oxford, Northampton, and South Lincolnshire. The stone of Doulting, near Shepton Mallet, in Somerset, belongs to this formation, and has been much used in Wells Cathedral; Glastonbury Abbey, and elsewhere, being a light-brown, shelly Oolite, weighing 134lb. per cubic foot. Good building stone, much used in Bristol, is obtained at Dundryhill; and a ferruginous, brown, shelly limestone at Hamhill, near Yeovil, which is largely used for building purposes in the neighbourhood.

In Gloucester the Lower Oolite yields good building stone at Stinchcombe, Wotton-under-Edge, Painswick, Leckhampton, Cheltenham, and other localities in the Cotswold hills; that from Leckhampton having been used in Gloucester Cathedral, Tewkesbury Abbey, Sudeley Castle, and many other buildings in the Vale of Severn; that obtained near Painswick is of fine quality, resembling Caen stone, and is in much request for architectural work. In Dorset, this formation yields sandstone, marble, and freestone, in the neighbourhood of Sherborne. In Lincoln and Rutland it is developed as a cream-coloured marly limestone with Oolitic ragstone, being quarried near Stamford, Barnack, Casterton, Ketton, Ponton, Corby, Haydon, Ancaster, and Grantham. In Northampton a peculiar calcareous sandstone is obtained at Collyweston, Wittering, Easton, Deane, and Kirby, which, after exposure to weather, is capable of being split into thin flagstones, largely used in the locality for roofing purposes, and known by the name of "Collyweston slates."

Lias.—Underlying the Oolites, but generally classed in the same series, we find alternating beds of argillaceous limestone and clay or shale in regular layers called the "Lias," the outcrop of which forms a conspicuous band, stretching across England from Whitby and Redcar on the Yorkshire coast, in a south-westerly direction to Lyme Regis, in Dorset. Organic remains abound in this formation, which is divided into Upper, Middle, and Lower Lias.

Upper Lias consists of clayey beds with nodules of limestone, well developed in Gloucestershire at Bredon Hill and Cleve

Cloud; in Dorset at Lyme Regis; in Somerset, at Glastonbury Tor, Brent Knoll, and Dundry Hill; in the north-east coast of Yorkshire, at the Cleveland Hills, and near Whitby, where the Lias cliffs are 300 to 400 feet high of dark grey shaley clay, in which the Whitby jet is found; it is also found in parts of Leicester, Northampton, and Lincolnshire. The clay is largely used in the manufacture of bricks, tiles, and drain-pipes.

Middle Lias or Marlstone contains argillaceous limestone and marlstone with layers of sands, clays, and nodular limestone below; these beds are chiefly developed in the Cotswold hills, and are also found in parts of Oxford, Northampton, Rutland, and Leicestershire, being quarried for stone and lime; they generally yield a good supply of water.

Lower Lias consists of bands of clay and impure limestone, with a bed of blue limestone below. It attains a great thickness in Dorset, Somerset, Glamorgan, Gloucester, Worcester, and Warwickshire; it is also found in Leicester and Northampton, being seen in the cuttings of the railway between Kirby and Whissendine.

In Dorset the Lias is quarried at Castle Carey for the white and blue stones which are employed for building, and also for burning into lime; cement stones are found in the lower beds at Lyme Regis, &c. In Somerset it is quarried for lime at Bodminster and Keynsham near Bristol, and for large slabs of paving-stone at Street, Keinton Mandeville, and Knapp, near Taunton; also for building stones or hydraulic lime at Curry, Mallet, Watchet, Wellington, and Yeovil; near Langport a building stone is obtained which has been much used in building the neighbouring churches. In Glamorgan it is found in the cliffs at Sutton, Southerndown, and Dunraven, the freestone of Sutton, near Merthyr, having been used in building Llandaff Cathedral. In Gloucester the Upper Lias clay is used largely in the manufacture of bricks and tiles at Cirencester, Stroud, and Brinscomb, and the clay of the Lower Lias at Moreton-in-Marsh and Evesham. In Lincolnshire the stone of the Upper Lias is burnt into lime at Scawby, and the clay is made into bricks and tiles at Lincoln. In Rutland a superior dark, cream-coloured freestone is quarried at Ketton. In Oxfordshire the clays are made into brick and tile at Banbury, Bicester, Chipping Norton, Shipton, Deddington, and Woodstock. In Northamptonshire the Lias clay is used for brick and tile at Northampton, Daventry, Thrapstone, Blisworth, Market Harborough, Moulton, Towcester, Kettering, Wellingborough, and other localities; while near Stamford it is extensively employed in the manufacture of terra-cotta, glass and other materials being mixed with the clay to give it the requisite hardness; stone is also quarried from the beds in some parts of this county, and used as building materials or burnt into lime. In Leicestershire the Lias limestone is made into lime at Barrow-on-Soar and other localities, while at Leicester the clay is worked for brickmaking. In Worcester bricks are made from it at Pershore and Evesham, and also at Rugby in Warwickshire; the stone is quarried near Stratford-on-Avon for lime and building. In Yorkshire there are quarries of "whinstone" in the Upper Lias at Egton, near Whitby, which has been much employed in Whitby as a building stone.

The Lias formation is chiefly valuable to the builder for the excellent hydraulic lime obtained from it, which, when mixed with sand, slacks slowly, and has the property of setting under water. The term *shale*, which we have frequently used, is applied to a clay which has become hardened and laminated by pressure.

CORRECTION.—In the previous article at page 113, line 28 of the second column, for "Rugall" read "Reigate."

COMPETITIONS.

BUSHEY.—Five architects have been invited to send in designs in limited competition by the 21st inst. for the erection of a new church at New Bushey, near Watford, Herts. Messrs. Coe and Robinson, Mr. W. Young, of Exeter Hall (the architect of Oxhey Grange, the residence of one of the principal donors of the new church), Mr. W. T. Mley; Mr. Synce, of Watford; Mr. Raikes, and two other architects acting together, whose names are unknown to us, are the competitors. We believe the cost of the new church will be somewhere about £4,000.

METROPOLITAN FREE HOSPITAL.—The old premises of this institution, situated in Devonshire-square, Bishopsgate, were taken by the Metropolitan Railway in 1875 for the purposes of the extension of their line. Since that time the hospital has been located in temporary premises in Commercial-street, Spitalfields. The committee recently invited six architects to prepare plans for a proposed new building. Designs from each of those gentlemen were submitted on December 2nd, 1878, under mottoes. In order to ensure perfect fairness in the selection, the committee appointed Mr. Edward P'Anson to examine the drawings, and to report as to their various merits. The result has been that Mr. P'Anson has recommended the design bearing the motto "Ad rem," as first in order of merit, and for pre-emption, being the second best submitted, that bearing the motto "Civis" in a red lozenge. Upon opening the envelopes containing the names of the competitors, the authors of the first were found to be Mr. H. H. Collins and Mr. James Edmeston, and the authors of the second Mr. James Edmeston and Mr. H. H. Collins. These gentlemen acted in conjunction. The architects will be at once instructed to proceed with the work. A review of the designs will be found on our opening page.

WEDNESBURY.—Thirty-three sets of designs were submitted for the proposed Board school in Lower High-street, Wednesbury, and twenty-eight for that in New Town. For the former the plans of Messrs. Alexander and Henman, of Stockton-on-Tees and Middlesbrough, have been selected; and for the latter those of Mr. Elliott J. Ettwell, of West Bromwich. The Board greatly regret that their award has been so long delayed, but this has arisen from causes for which they are not in any way responsible. Certain persons who were opposed to the erection of the schools in High-street took occasion to express their views in a memorial to the Education Department, which gave rise to considerable correspondence, and while this was in progress the Board thought it right to suspend the examination of the plans.

A meeting was held at Lincoln, on Saturday afternoon, to take into consideration a proposal to form an art museum at Lincoln, on the plan of the one recently organised at Nottingham. The proposal originated with Bishop Wordsworth, who announced his intention of giving £1,000. A resolution was unanimously passed to the effect that a school of art, free library, and museum were urgently needed, and a committee was formed to take preliminary steps for the purchase of the old county hospital and grounds.

Mr. J. W. Hobbs, hon. secretary of the Croydon District Master Builders' Association, writes to the South London newspapers complaining of the administration of the Dulwich College estate. He says, "For many years past frequent and irreparable injury has been caused to builders who have taken land on the above estate, by the gross negligence shown in the signing of the leases required. I have known cases where no money compensation could counteract the injury caused. Were I the sufferer, I should know how to treat the matter, as there is such a thing as unliquidated damages."

Wesley College, Dublin, was opened on the 30th ult. It is situated on the north side of St. Stephen's Green, beside the Wesleyan Centenary Chapel. It is Gothic in style, and has been erected from the designs of Mr. Alfred G. Jones, of Dublin. The buildings are of red brick with limestone and granite dressings, and bands of blue and white brick. Over the governor's house, in the centre of the buildings, is a richly-ornamented clock-turret finished with a spire.

The parish church of Bexhill, Surrey, is about to be restored, from the designs of Mr. W. Butterfield. The church will be enlarged by 100 sittings, after allowing for the removal of three galleries, and the tower will be rebuilt. For the execution of the work the tender of Mr. Gaskin, of Canterbury, has been accepted at £4,131.

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ILLUSTRATIONS.

ST. MARY'S, TRURO.—DRAWING ROOM CABINET—STAIRCASE, HALL, AND DINING ROOM AT FINCHLEY ROAD—DAIRY, HIGHFIELD—HOLY TRINITY CHURCH, CLAPHAM.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ST. MARY'S, TRURO.

THIS drawing was made prior to the creation of the See of Truro, with a view to increase the size of the Parish Church, and at the same time to retain the better or old portion of the existing Church intact. The large scale drawing gives a plan and elevation of one bay of the south wall of existing church, which, with the perspective view, gives a fair representation of the character and size of old St. Mary's Church. The work is principally executed in Pentenian, a local stone, but its condition is very dilapidated. Mr. J. P. St. Aubyn, architect, is the author of the design for new work illustrated. Designs for the new cathedral, now proposed to be erected from Mr. J. L. Pearson's drawings, will be found in the BUILDING NEWS for June 21st (Mr. James Hicks's); Dec. 6th (Mr. J. M. Brydson's), and Dec. 20th (Mr. J. P. St. Aubyn's)—all in last year.

NEW DINING-ROOM, OAK STAIRCASE, AND SCREEN TO HOUSE IN FINCHLEY-ROAD, LONDON.

THE view illustrates a new dining-room lately erected at a house in Finchley-road, London, being part of extensive additions. The house having been erected in somewhat of the Elizabethan style, the new portions have been made to assimilate with it; the floors also of the new part are made to range with the formerly existing floors of the house. The dado all round the room as well as all the joinery of the doors, window, &c., is of oak well moulded. The floor is laid with parquetry of a special design, and the ceiling (which is in plaster) is designed to suit a central sun-burner by which the room is well lighted; portions of the window are glazed with stained glass, the designs being illustrative of the seasons. The staircase, which is taken from a drawing exhibited last year at the Royal Academy, is of oak. It is erected in the same house as the dining-room just mentioned, being situate adjoining a long and handsome corridor, and divided from it by the screen shown in the view. It is lighted by a lofty stained-glass window at the side and over the small window shown under the stairs. The newel of the staircase is carved, and the whole work executed by Messrs. Lorraine, builders, of Pittfield Wharf, Waterloo Bridge. The works, including both dining-room and staircase, have been carried out from the designs and under the superintendence of Mr. Henry L. Legg, architect, of Christ's Hospital, London.

DAIRY COTTAGE, HIGHFIELD, SHREWSBURY.

THIS dairy cottage is now being built for Thomas Middleton Howells, Esq., from the design of Messrs. Treasure and Son, of Shrewsbury. It is of brick walling generally, with oak framing externally, except chimney bases and lower

portion of porch and bay window, which are of Grinshill red and white rubble random stone; panels between framing are cemented, and chimney stacks are of brown Broseley bricks, the roof being covered with brown or dark strawberry-coloured Broseley tiles, with red ridge cresting. All wood framing painted black, and panels white.

HOLY TRINITY, CLAPHAM, DISTRICT CHURCH OF ST. PETER.

THIS church is about to be erected in Manor-street, Clapham-common, and in the parish of Holy Trinity. The walls will be of stock brick, relieved with bands and diapers of red brick. All the arches of doors, windows, and arcade, as well as all strings and labels, will also be of red brick. The roofs, of plain wrought deal, will be covered with blue slates, and it is proposed to make the copings of terra-cotta. The church will be seated with chairs, and will accommodate 600 persons. The church is to be built in sections, a portion of the nave up to the clerestory level being the first. The whole building when finished will have cost £1,500. Mr. J. Edward K. Cutts is the architect.

DRAWING-ROOM CABINET.

THE cabinet which we illustrate this week is from the designs of Mr. W. Galsworthy Davie, architect, and has recently been made by Messrs. Hide Bros. and Cook, of Worthing. It is principally in walnut, the panels and a few other parts being in wainscot, the whole dull polished. The lyre birds are intended to represent Music, the wren Song, and the coquette what the name implies. The carving has been executed from full-size drawings supplied by the architect.

SCHOOLS OF ART.

NOTTINGHAM.—The Nottingham School of Art still maintains its foremost position among similar institutions. At the annual meeting held on Monday week, Mr. J. S. Rawle, the head-master, reported that 3,031 drawings, paintings, designs, &c., had been sent to South Kensington for inspection. Last year 3,999 works were submitted. The decrease in number is owing to the fact, that a greater proportion of the works this year were in the higher stages. Sixty-seven advanced works were chosen by the examiners for exhibition at South Kensington Museum, being one-sixteenth of the entire number selected throughout the country. Last year 67 works were exhibited. In the "National Art Competition," the school obtained 2 out of the 9 gold medals awarded, besides 2 silver, and 4 bronze medals, and 13 Queen's prizes; making a total of 21 awards,—that is, fifty per cent. more than the average number of awards gained during the past ten years. One of the gold medals was gained for a lace design,—the other for architectural design. This is the third time since 1870 that Nottingham has won the highest award in the country for architectural design. The other national awards were given for drawing the human figure from the antique, painting still-life from nature, designing for lace and other art-manufactures, &c. 14 students received free art-studentships, being two less than last year. 45 students gained 58 third-grade prizes, for drawing and painting from the living model; drawing the human figure from the antique; painting landscape and still-life from nature; modelling the human figure from the antique and from nature, &c. Last year 51 works were considered worthy of third-grade prizes. In the advanced third-grade examinations, held in May and June last, 2 candidates obtained marks for "excellence," entitling them to receive Queen's prizes. 7 works were marked "good." 1 student passed in painting still-life from nature, 1 in drawing from the living model, 5 in an examination in styles of architecture, &c., 10 in ornamental design, and 5 in advanced perspective. Total, 22 successes, against 14, last year. In the elementary, or second-grade examinations, in freehand drawing, practical geometry, perspective and model drawing, 90 candidates were successful in 119 papers. 28 students obtained marks for "excellence." Last year 111 candidates were successful in 153 papers. 22 students obtained full certificates for having passed in all the second-grade subjects. Last year 20 full certificates were gained. In the National Art Competition for 1878, Nottingham has again taken a greater number of awards than any

other School of Art in the Kingdom. The following are the most successful schools: Nottingham, 22 awards; Edinburgh, 20; South Kensington Head Schools, 18; Birmingham, 17; Westminster (London), 13; Brighton, 10; West London, 10; Lincoln, 9; St. Martin's (London), 9; Bloomsbury (London), 8; Manchester R.L., 3; Belfast, 7; Lambeth (London), 6; Kidderminster, 6; Leicester, 5; Dublin, 4; Dundee, 4; Hanley, 4; Manchester G.S., 4; Salisbury, 4; Sheffield, 4; etc. Nottingham has taken about 1-11th of the entire number of awards distributed throughout the country, to 144 Schools of Art.

WATER SUPPLY AND SANITARY MATTERS.

FEATHERSTONE, YORKSHIRE.—On Wednesday last, an inquiry was held by Mr. John Thornhill Harrison, C.E., with reference to the application of the Featherstone Local Board of Health, to borrow the sum of £7,000, for the execution of sewerage works for the townships of South Featherstone, Preston, and Stretchouse, within this district, in accordance with plan prepared by Mr. A. W. Cross, Lond. Inst., C.E., the surveyor to the board, under the direction of Messrs. Hodson, Price, and Hodson, of Loughborough, the consulting engineers. The scheme provides for the main drainage of the three townships, the sewage being brought to one point of outfall, where it is proposed to deal with it by irrigation over 28 acres of land. Considerable opposition was raised to the scheme, principally upon the ground that the Local Board had not taken any steps for serving other townships within their district, which it was intended to rate for the repayment of the loan, and on the ground that the outfall gradients were too flat. The Inspector overruled the objections as to gradients, saying that in his opinion the best possible falls had been provided that the district allowed, and said that he should report favourably as to the scheme, and that he would also bring the matter of the other townships before the Local Government Board.

THE POLLUTION OF RIVERS.—On Monday the annual meeting of the Association for the Preservation of the Rivers of Scotland from Pollution was held in the Freemasons' Hall, Edinburgh. The report advocated the appointment of Conservancy Boards throughout the country, who should have power to take steps for the prevention of river pollution under the provisions of the Act of 1876, and suggested that the Council of the Association be empowered to petition the Government to appoint such Boards. It was resolved "That this meeting is of opinion that there ought to be in this country, as in most other countries, a department of executive, one duty of which should be to look after the pollution of rivers, and see that they are kept free from such gross pollutions as not only unfit them for their primary purposes, but convert them into carriers of nuisances in the districts through which they flow."

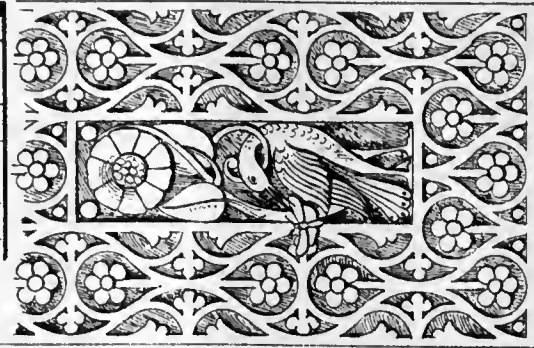
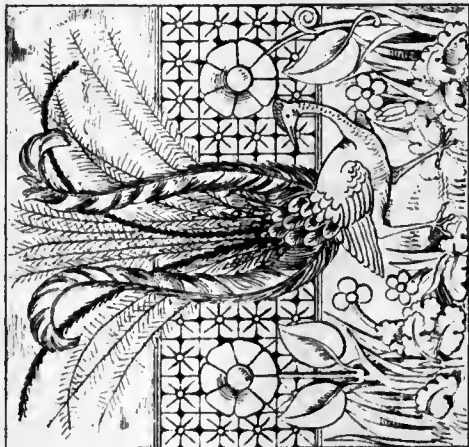
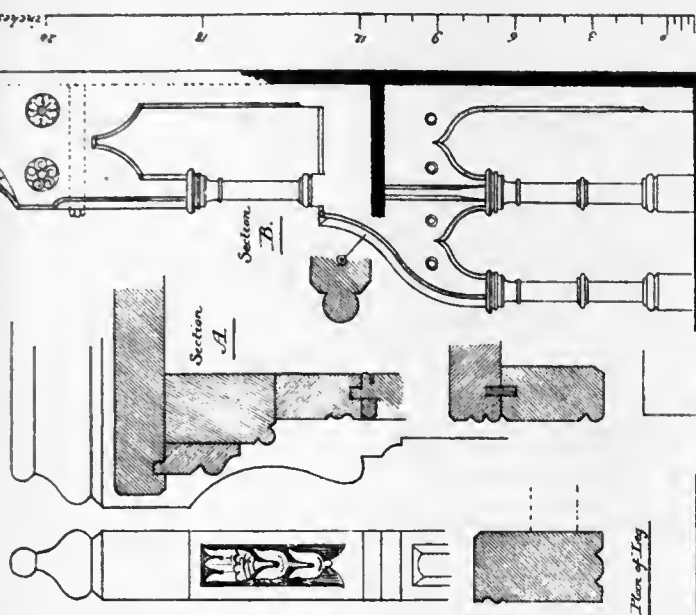
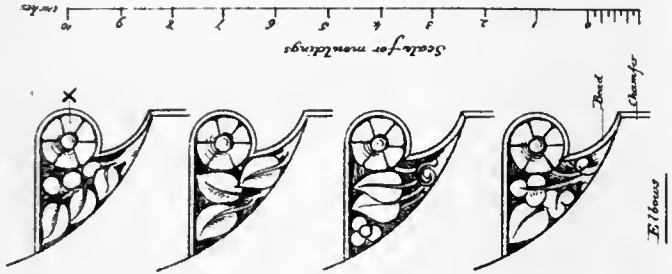
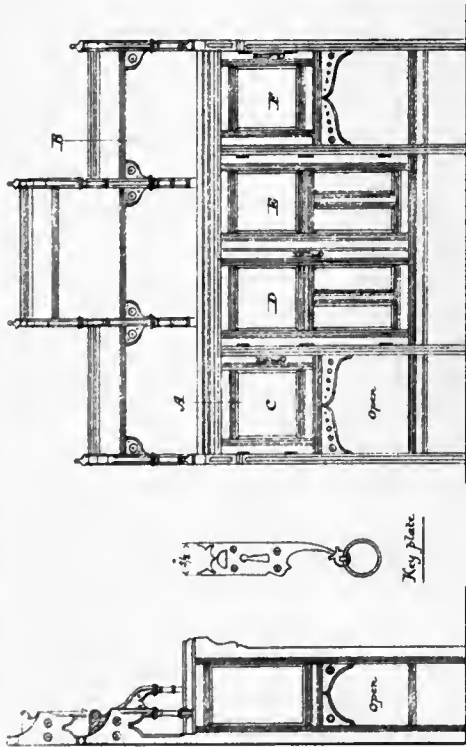
A brickmaker named William Mercer, out on strike, was on Tuesday charged before the Liverpool stipendiary with intimidating a labourer. The magistrate thought the case proved and decided that the prisoner must pay a penalty of £5 and costs, or suffer a month's imprisonment with hard labour. He remarked that, should any other case arise, he should not be inclined to pass them over with a fine.

The Colonial Government at Sydney have telegraphed to the Agent-General urging the importance of the London committee securing for the Exhibition effective art and educational collections and sanitary appliances. We are asked to say that communications should be addressed to Mr. Jonbert, 5, Westminster-chambers, Victoria-street. An extension of the space intended for European exhibitors has now been accorded.

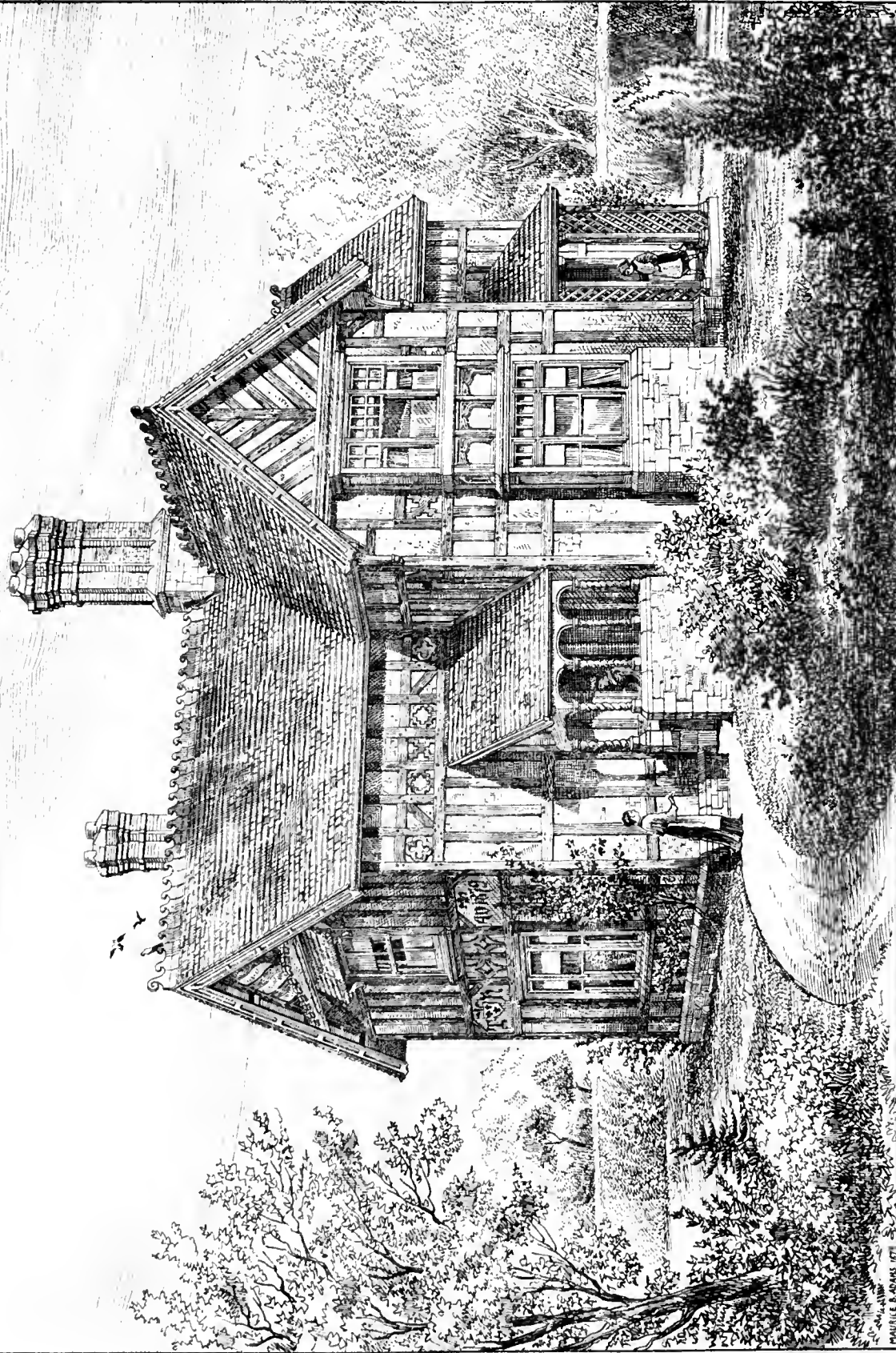
Lord Penzance sat as Dean of Arches on Saturday, to decide an application by the Rev. David Williams, vicar of Llanelly, Carmarthenshire, for a faculty to create a reredos in the chapel-of-ease of All Saints, being a sculptured representation of the Crucifixion of our Saviour, in Caen-stone. After an examination of the plans, the Dean of Arches pronounced the opinion that the reredos was legal, and decreed a faculty.

The Croydon Gas Company have accepted the tender of Mr. James Smith, amounting to £2,325, for the erection of new offices in Katherine-street, from the designs of Messrs. Berney and Monday.

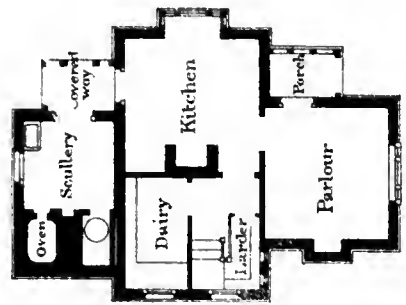
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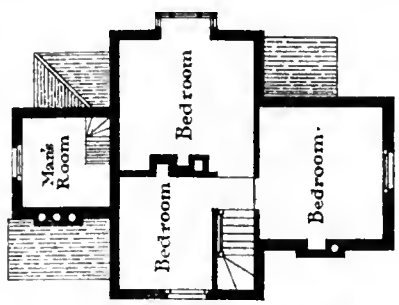
Nov 1878



DAIRY COTTAGE
HIGHFIELD
SHREWSBURY for
T.M. Howells Esq.
TREASURE & SON - ARCHITECTS



Ground Plan.



Chamber Plan

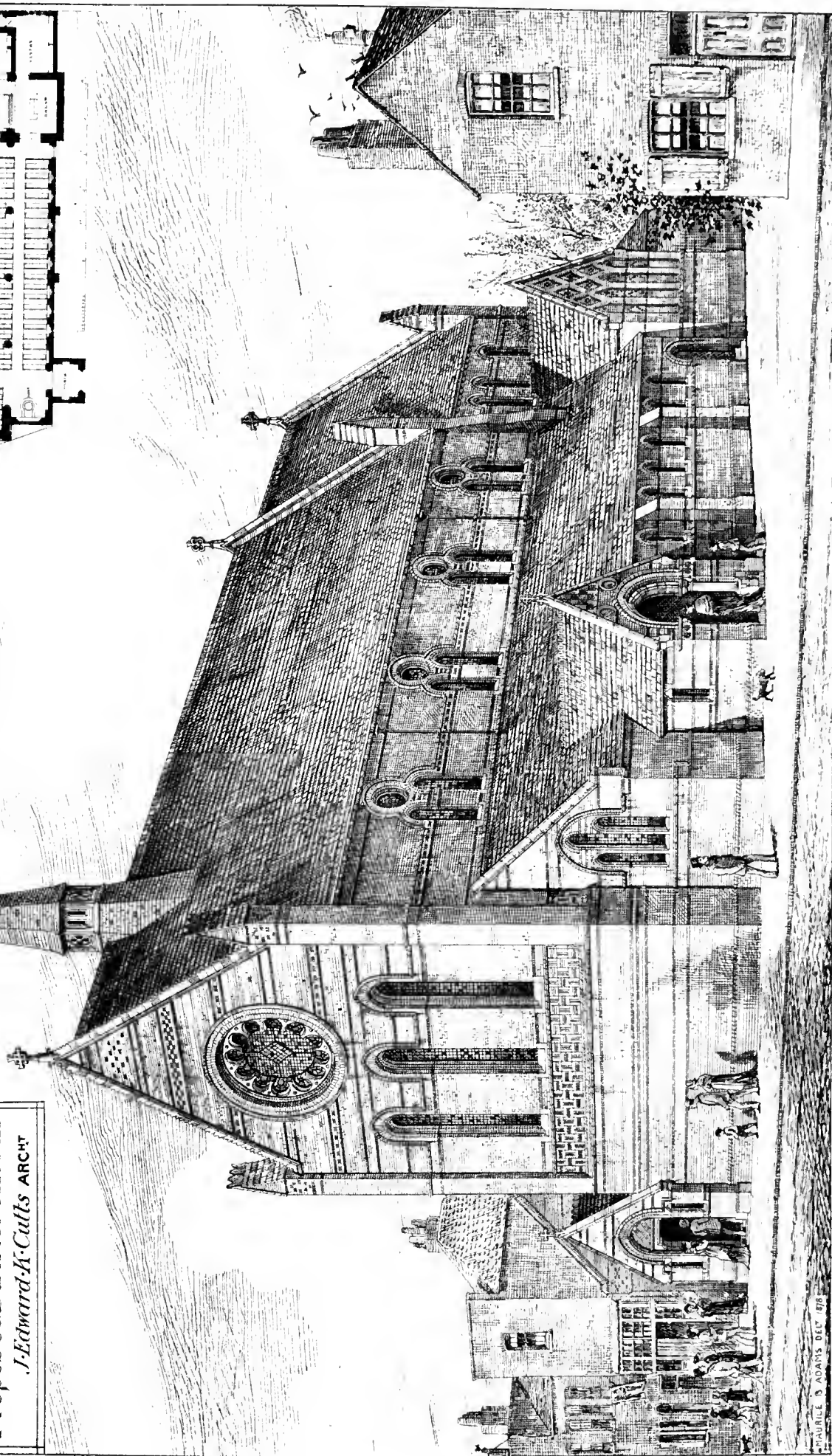
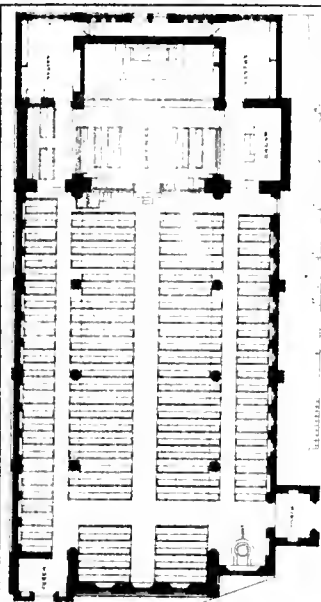


Photo Lithographed & Printed by James Ackerman, 5, Queen Square, W.C.

HOLY · TRINITY ·
· CLAPHAM ·

Proposed District Church.

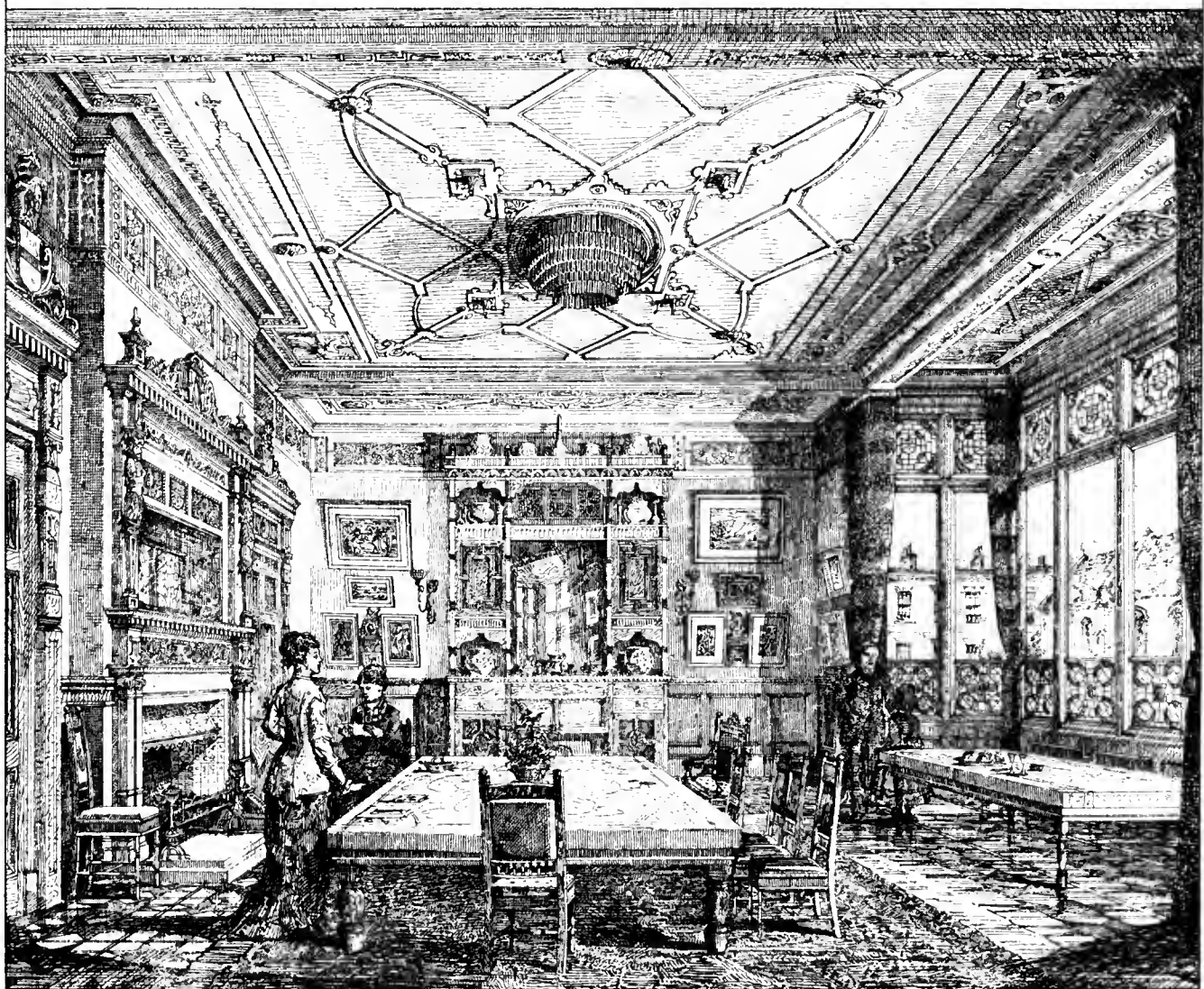
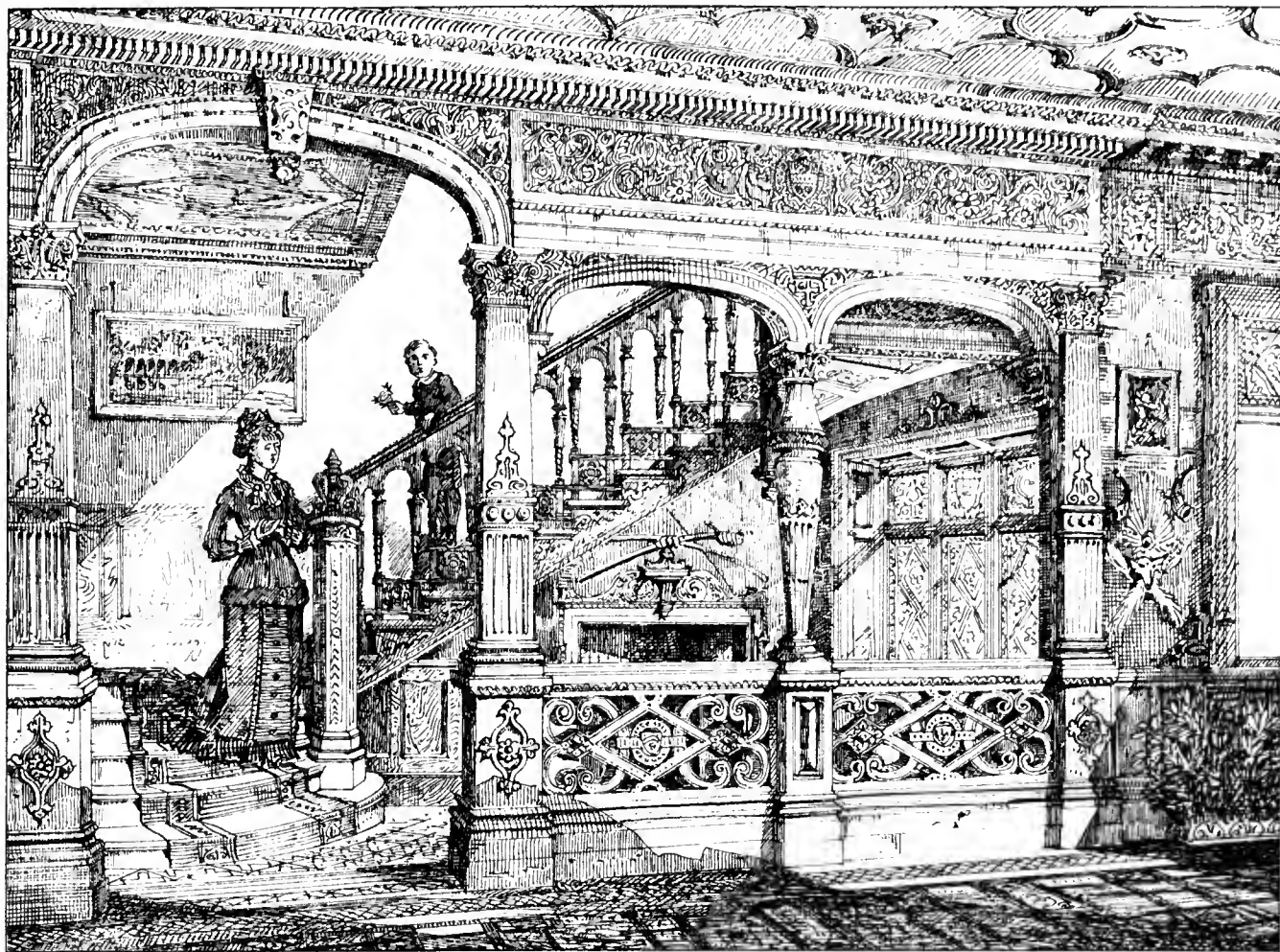
J. Edward · H. Culps ARCHT



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Printed by J. G. & J. H. Adams, 15, Abchurch Lane, London, E.C. 4.

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STAIRCASE, HALL & DINING ROOM FINCHLEY ROAD

HENRY C. LEGG, ARCHT.

Phot. Lithographed & Printed by Isaac A. Newman & Co. Green Square

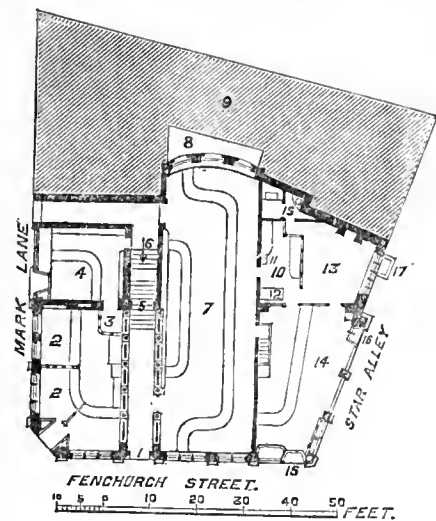
ARCHITECTURAL ASSOCIATION.

An ordinary meeting of the Association was held on Friday evening, the President, Mr. H. L. Florence, in the chair. The following were elected members:—Messrs. F. Nicholson, Mummery, H. O. Creswell, A. Broad, Slater, W. E. Coles, and G. Harvey. A vote of thanks was passed to Messrs. Francis Brothers and Saunders for permitting the members to go over the Grand Hotel, Northumberland-avenue, on the motion of Mr. Hayes, hon. sec., who also announced that the next visit would take place on Saturday, February 8th, to Mr. Bentley's Church, Cadogan-place, Chelsea.

HOTELS AND RESTAURANTS.

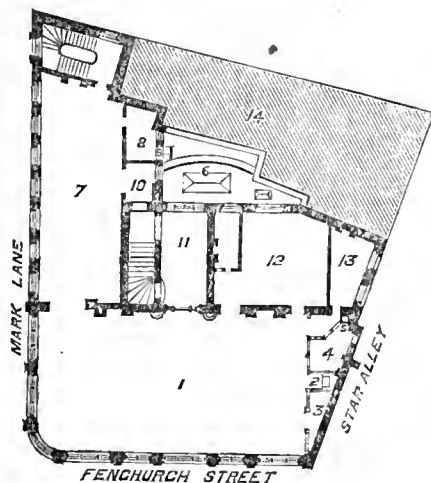
Mr. FREDERICK J. FRANCIS read a paper on "Hotels and Restaurants," illustrated by a series of plans and drawings. Opening his subject by sketching a typical American hotel housing from 1,000 to 1,200 guests in comfort, and furnished with lifts, electric bells, and telegraph wires, and all the other ingenuities of modern invention by which human labour can be abridged, Mr. Francis remarked that such vast and magnificent establishments could only be supported in populous and thriving cities, and by a people who preferred the bustle and excitement of society to the quiet and comparative isolation of household life. The growth of the modern restaurant was traced from the old-fashioned London coffee-house, and it was observed that these places of public refreshment have now reached such a pitch of elegance, luxury, and completeness as to offer nearly the same advantages as a club and at much less cost. In his lecture he proposed to explain what had been done by the firm of which he was a member in four of their works—Crosby Hall, Bishopsgate; the King's Head, Fenchurch-street; the Holborn Restaurant, and the Palmerston, Old Broad-street. In 1867 Crosby Hall came into the hands of its present proprietors; under the hands of Messrs. Francis Brothers and Saunders it underwent a complete metamorphosis, and subsequently an important addition was made on the north side. The original structure was erected by Sir John Crosby, who died in 1473, but the name of the architect is unknown. In 1640 it came into the hands of Sir John Langham, and in his time the chief encroachments on the hall were made, and the great hall on the ground-floor became a grocer's warehouse. In 1672 the upper hall was converted into a meeting-house by the insertion of a floor on the level of the original minstrels' gallery. The general ground-plan of Crosby Place shows the covering of a very extensive area as belonging to the first foundations, of which only a comparatively small part remains. Fortunately, however, all that constitutes its most conspicuous architectural merit is preserved, notably the council-room and the banquetting hall on the ground-floor, and the throne-room over the council-room on the first floor. When the present proprietors became possessed of the building it was determined to convert it into a large City restaurant, but the instructions were to carry out the works in strict conformity with the original architecture, and to call in the aid of painting, stained glass, and ornamental brass-work to produce a harmonious effect. The works to the original structure were carried out in 1868, and it was not till 1873 that the additional ground was acquired. Upon this site new buildings, in accordance with the style of the old building, were erected, faced externally with stone and with the interior decorated similar to the older structure. The council-room and the whole of the extensions are appropriated to luncheon counters. The wall space is occupied by large oil paintings, representing events in English history, and in the stained-glass windows are busts of many of the rulers of England from Julius Caesar to George I. In excavating the foundations of the new buildings a fine piece of tessellated pavement was discovered 12ft. below the street level. This has been framed and glazed and inserted in the wall facing the staircase. The floor throughout is laid with encaustic tiles, and the ceilings are panelled and decorated with Tudor enrichments, the whole overlaid with polychromatic decoration. In the banquetting-room little was needed to bring out the fine proportions and superb detail of the original building. An unsightly gallery had to be removed, but the windows were intact. The exquisite bay window, with its beautiful groined ceiling, required nothing but cleansing, as also

the fine roof, with its transverse and longitudinal ribs, and rich traceried insertions. At the north end of the great hall was the minstrels' gallery with an enriched traceried front and a four-centred lofty arch leading to a waiting-room behind. The throne-room is over the council-chamber, and has a wagon-headed ceiling divided between the main ribs by enriched square panels. Here again the work had not been tampered with, and there was little to do but to decorate. The stonework was renewed under the superintendence of Mr. Blackburn, in 1836. At that time the building had been thought to be incapable of substantial repair, and a placard was issued announcing the premises to be sold



GROUND PLAN.

- | | |
|---------------------------|--------------------------|
| 1. Main Entrance. | 9. Space occupied by |
| 2. American Stores. | Offices. |
| 3. Manager's Office. | 10. Serving Room. |
| 4. Fish Bar. | 11. Lift up to Basement. |
| 5. Marble Staircase up to | 12. Lift up to Kitchen. |
| Dining Rooms. | 13. Luncheon Parlour. |
| 6. Stairs down to Grill | 14. Confectioner's Shop. |
| Room. | 15. Ladies' Lavatory. |
| 7. Luncheon Buffet. | 16. Doors. |
| 8. Open Light Court. | 17. Cellar Flap. |



FIRST FLOOR PLAN.

- | | |
|-------------------------|-----------------------|
| 1. The Queen's Dining | 8. Serving Room. |
| Room. | 9. Lift to Kitchen. |
| 2. Grill. | 10. Lobby. |
| 3. Hats and Coats. | 11. Landing. |
| 4. Wine Bar. | 12. Serving Room. |
| 5. Lift. | 13. Private Office. |
| 6. Skylight to Luncheon | 14. Space occupied by |
| Buffet, &c. | Offices. |
| 7. The Alabaster Room. | |

THE KING'S HEAD TAVERN, CITY.

on a building lease. At this juncture a public appeal was made for subscriptions, and a lady, Miss Hackett, came forward and took the lease and carried out a scheme of restoration with public spirit and good taste. The mediaeval smoking-room is a parallelogram-shaped apartment, with an arched recess on eastern side. It is lighted by deeply-recessed Gothic windows and an oriel window. On the walls have been hung a series of historical paintings, and there are medallions representing the zodiacal signs. The windows represent figures of the moral virtues. The kitchen department occupies the second and third floors, and two sets of lifts com-

municate with the principal rooms. The steam-boiler serves the auxiliary purpose of warming and ventilating the smoking-room. The King's Head Tavern, at the corner of Mark-lane and Fenchurch-street, may well claim to be an example of the earliest of the houses of rest and refreshment. It had the honour of a visit from Queen Elizabeth on the occasion of her release from the Tower. She is reputed to have dined off pork and peas served in a dish and cover still to be seen at the King's Head. The old building, altered, cut about, with its inconvenient kitchen on the ground-floor, and its irregular-shaped rooms and low-pitched ceilings, was not capable of being satisfactorily converted into a spacious modern restaurant, and we were, therefore, commissioned entirely to take it down and rebuild the premises. (See ground and first-floor plans.) The site was advantageously placed for reconstruction as there is ample frontage both in Fenchurch-street and Mark-lane, and also the power of opening windows in Star-alley. A double basement was provided, as the locality is well suited for the wine trade, and the lowest story was carried to a depth of 20ft. below the street level. The vaults were erected at the outset of the works to form a proper abutment for keeping up the roadway, and fireproof flooring on Fox and Barrett's principle was adopted both for ground-floor and upper basement. The lower basement floor was asphalted, and asphalt was also laid vertically on the walls to prevent access of damp to cellars. The principal entrance is in Fenchurch-street, which leads at once into a lobby, with carved ceilings, and arched side recesses, fitted with embossed glass. On the right, immediate access is obtained to the luncheon buffet (62ft. by 20ft.), and the mural decoration adopted for this room shows what may be effected by the use of art-tile painting for internal ornament. In no building in London has art-tile painting been so extensively introduced. The whole of the work in this room, and also that on the marble staircase, the first-floor vestibule, the Queen's dining-room, and the smoking-room, have been executed by Mr. Alexander Gibbs, of Bloomsbury-street. Although the original cost is considerable, yet being of so enduring a material, and so readily cleaned, it may be safely commended for notice and adoption. In the arched recesses in the luncheon buffet, the art-tile paintings illustrate the plays of Shakespeare. The counter front, the panelled ceiling, and the gas lantern and pendants, these latter by Messrs. Verity, of King-street, Covent-garden, are all designed with special reference to the architecture of the building. Underneath this luncheon buffet, and approached from a staircase of good proportions, is the chop and grill room. It measures 62ft. by 20ft., like the room above. Ventilation is gained by windows at each end, also by a ventilating cornice all round the room, communicating with a large vertical zinc tube running to the top of the building, and connected with the flue of the grill. The whole wall surface has been lined with light glazed tiles, which are clean, cheerful in colour, allowing no home for vermin, and indestructible and permanent. Connected with this room are lavatories and other conveniences. Returning to the ground-floor, and proceeding along the corridor from Fenchurch-street, is the Silician marble staircase leading to the Queen's dining-room. This staircase is 6ft. wide; on either side the walls are decorated with five art-tile paintings, representing the arrival of Queen Elizabeth at Tilbury, her royal procession on the Thames, and the procession of Edward VI., surrounded by the Royal and City arms. The first-floor landing is lighted by a stained-glass window, representing Picard, the Lord Mayor of London, entertaining Edward of England and the Kings of France, Scotland, and Cyprus. On the walls of the landing are a series of full-length figures of famous men of the Elizabethan period. The Queen's room, approached by this landing, occupies the entire of the Fenchurch-street elevation, and is lighted by windows on this and the Mark-lane fronts. It is 60ft. by 30ft., and is one of the largest dining-rooms in the City without any internal pier or column of support. The ceiling is composed of a series of geometric panels, with foliated enrichments, and the walls exhibits a complete series of illustrations from Tennyson's "Coming of Arthur," and the "Idylls of the King." The ornamentation of the space over and around the doorway in this room is in keeping, consisting of knightly trophies,

interspersed with floral and arabesque designs. The gas-fittings are chandeliers, supplied by Messrs. Verity. The chimney-pieces, with the silvered glasses over, are of some elaboration of design, consisting of a union of oak and marble, and these were supplied by Mr. Austey, of Alpha-road. In the centre of a screen is a grill, fitted round with glazed tiles; the remaining arches are occupied by recesses for coats, and for drawing wine and beer. A spacious servery is situated on this floor in contiguity with the dining-room, and communicating by lifts with kitchens at the top of the building. On the second floor the smoking-room, 35ft. by 31ft., occupies the most important position. It is carried through two floors, and provided with a gallery all round. It is lighted with two rows of windows, and also by a very large central skylight. The walls are decorated with art-tile paintings, including illustrations of the Seven Ages of Man, and a picture of Shakespeare reading his plays to Queen Elizabeth. There are other paintings, of flowers and birds, on the gallery level. Adjoining the smoking-room is another dining-room, 31ft. by 26ft., called the Marble Room, as the walls above the dado are panelled with coloured marbles; above these are carved oak panels, illuminated with heraldic shields. This dining-room opens into a small private dining-room, 16ft. by 12ft., fitted all round with pitch-pine framing in small panels. The second landing on the grand staircase contains a window of stained glass, representing Whittington, Lord Mayor, burning the bonds of Henry V. The kitchen and scullery are placed on the third floor. In both the floors are covered with chequered plates, screwed to the boards, with white-lead and felt joints, turned up two inches all round next the wall, with overflow pipes between joists to take away any water. The walls are covered with white tiles. On the fourth floor is the larder. The large chop-room in basement has a grill stove fitted with hot closets. The flue of this, which is of iron, is carried above the roof of the building, and is surrounded by an iron case for ventilating the room. On the first and second floors are serving rooms. The whole of the closets, cutting tables, &c., are heated by steam from the boilers in kitchen. The whole of these fittings were executed by Mr. Waller, of Fish-street-hill. On same floor as kitchen is a large bakers' oven in two compartments; it weighs upwards of 40 tons, and considerable care had to be taken in the construction to carry securely this weight. Since completion, an area in the first floor, originally devoted to offices, has been appropriated as an extra dining-room. It is called the Alabaster Room, as the walls, including dados and cornices, are lined with marble, arranged as pilasters and panels. The ceiling is panelled in wood and tinted, and the floor is of oak-laid herring-bone. The angle building on ground floor (the "American Stores") is devoted to tavern business, but here the Elizabethan character has been maintained in the ceiling and all joiners' details, while the windows are of stained glass, with centre busts of historical personages. The exterior elevation is of red bricks, with Portland and Bath dressings, and is treated in Elizabethan style, with Classic details. That portion of building in Mark-lane not used for restaurant purposes is treated as ordinary street architecture. Speaking generally of this building, while it is not conspicuous for magnitude, it is considered successful in adaptation to purpose, economy of service, and ready supervision; the harmony of design has been carried through all the minor details and fittings, and were we to commence this work again we could not suggest any constructive improvement in general arrangement or practical detail. The *Holborn Restaurant* is located in premises which were successively a public bath, a circus, and an American refreshment house, and was re-constructed for its present purpose about four years since. The general dimensions are 155ft. by 140ft. The grand *salon* is 95ft. by 50ft., the grill room 41ft. by 37ft. On the first floor is a gallery all round the grand *salon*, a dining-room 55ft. by 26ft., another 36ft. by 20ft., and a smaller one. The remainder of the site is appropriated to lavatories and w.c.'s, and for private rooms and residences, and a hairdresser's shop in Holborn. Very little architectural alteration was required in the works carried out four years since, although the interior arrangements underwent an entire re-casting. The grand *salon* was refloored, new continuous sky-

lights erected along the east and west galleries, dividing partitions put up, and the large dining-room, called the Prince's *salon*, was formed by sweeping away a number of small apartments. The central lantern here is 32ft. by 16ft., and the room has the two long sides covered with silvered plate-glass. The kitchen was necessarily placed in the basement. The outlay has been considerable, but the adaptation has been pronounced successful. The *Palmerston Restaurant* forms the whole of the upper and part of a lower basement of Palmerston Buildings, extending from Old Broad-street to Bishopsgate-street. There are entrances in both streets, and a broad corridor connects the two thoroughfares. A luncheon-bar at the Bishopsgate entrance leads to an extensive range of skylighted apartments in which are billiard-tables. In the centre of the building is the French dining-room, adjoining which is the kitchen. Beyond this is the chop and grill-room, and on the opposite side of corridors the smoking-room, leading again to the billiard-rooms, and these again to the wine-bar. The reconstruction of the interior necessitated some difficult needling-up of heavy walls and chimney stacks more than 100ft. high. The cellarage in the lower basement exceeds 12,000ft. in area. Reference may be made to *Magog's* in Cheapside, a tavern where oil-paintings of a high class decorate the walls, where all the windows are filled with stained glass, and where unusual care has been bestowed on counters, gas fittings, and floors, with a result as far removed from the vulgar glare of the modern gin-palace as from the dingy rustiness of the old "public." We will pass on to notice the *Grand Hotel*, in Charing Cross and Northumberland-avenue. The area measures nearly 20,000 superficial feet. The ground-floor fronting the streets is designed for a series of thirteen shops. In Northumberland-street there will be a luncheon buffet 75ft. by 20ft.; a central dining-room 100ft. by 50ft., a secondary dining-room 41ft. by 35ft., and a smoking room 41ft. by 31ft., and 20ft. high. Under this room in the basement is a billiard-room; under the luncheon buffet is a grill-room lighted by corridors in Northumberland-street, and with wall surface laid round with glazed tiles. The remainder of this lower story is occupied by basements of shops, lavatories, and w.c.'s, luggage rooms, and subordinate offices. On the first floor are a series of sitting and bed rooms, having an average of 300ft. super., and with an approach corridor between. At the Northumberland-street end on the first, second, third, and fourth floors the space is appropriated to the kitchen department, the stores being on first, the larders on second, bakery on third, and kitchen ranges, &c., on fourth floor. On the first floor there are also a dining-room 41ft. by 32ft., and a library 21ft. by 19ft. The grand staircase, 25ft. by 19ft., extends from the upper basement to the attic. Instead of the ordinary treads and risers, it is intended that each step shall be carried by building iron joists in the walls, riveted to raking strings, and to form the foundation of the treads and risers from top to bottom, with Allen's patent concrete interlaced with hoop iron. Upon this will be fixed Sicilian marble treads and risers, mitred to cut and moulded string, and relieved with polished onyx paterae in ends of each step. On the upper flight Greenmoor stone will take the place of marble, and the strings will be in Portland cement finished with Parian. The soffits of stairs and landings will throughout be made and moulded in panels, finished in Parian cement for decoration. As the whole of the iron will be bedded-in into concrete this staircase would be a safe exit in case of fire; two hydrants will be provided on each landing. On the top floor of the hotel a large area has been reserved for the erection of a laundry, if subsequently found desirable. Independently of the large and secondary dining-rooms, billiard and smoking-rooms and drawing-room, and library on first floor, there are about 250 rooms. The character of the elevations was determined by the exigencies of the building. The curved sweep between Charing-cross and the Avenues added to the difficulty of picturesque combination, and the necessity of a sevenfold division of stories prevented massive treatment, while the very heavy ground-rent forbade sacrifice of any part of the area in recesses. The Italian style offered the least difficulty in designing, and the high mansard roofs at the east extremity of the front and on either side of the curved sweep will somewhat take off the horizontalism of the

façades. The large central dining-hall measures 100ft. by 50ft.; it will have a waggon-headed ceiling of glass and iron, with ornamental ribs, the whole double-glazed and provided with special appliances for ventilation. For the dados, pedestals, and columns used in decorating the ground and secondary saloons, veined and Sicilian marble will be used; the treatment of the panels between the pilasters is not yet determined upon. The smoking-room south of the main entrance and on the same level is 41ft. by 31ft., and upwards of 20ft. high. It will be ventilated by inlets of fresh air at the back of the skirting, by ventilating flues in the several walls, by a ventilating cornice running round the room and by the central sun-burner. The woodwork of this room will be of pitch-pine, French polished, with the mouldings relieved in gold, and the walls covered with stamped leather, paper, or æsthetic subjects on glazed tiles. The servery on ground-floor is 27ft. by 23ft., and being 20ft. high, has ample space for a surrounding gallery for various stores. The wine and beer cellars are under the grand saloon, and arrangements have been made by a separate series of air flues and pipes to regulate the temperature. The passenger lift will be worked by gearing below, the power being obtained by an eight horse-power gas-engine provided in duplicate. These engines are proposed to be the Otto silent gas-engine; when started, they require but little attention, and the cost of maintaining the same will not exceed 1d. per hour. The ordinary speed will be about 50ft. per minute; the power to be such that 12cwt. could be lifted at this speed. The ground and first floors are of fire-proof construction on Dennett's principle, the remaining part of moulding being ordinary timber girders and joists. In conclusion Mr. Francis said the hotel was, when the members visited it the previous Saturday, in a very incomplete state. When, he added, the structure approaches its completion, and we can realise the hopes formed as to the result of our labours; when the large central dining-room with its semi-circular roof, its marble columns, pilasters, and dado, and its combined silk and art-tile enrichments are finished, illuminated very probably by the electric light; when the several other reception rooms are ready with their distinctive detail and varied wall decoration; when we can walk up the marble staircase or traverse the several stories by the aid of the lift; when the multiplied cooking arrangements are in their places; when rooms are furnished and corridors completed—then it may be worthy another visit from the Association, and I shall be most happy, with the consent of the proprietors, to escort the members over the completed building, and to supplement the present hasty sketch with a better and more attractive description.

ROYAL ACADEMY LECTURES ON ARCHITECTURE.

THE GOTHIC REVIVAL AND SIR GILBERT SCOTT.

IN the second portion of the first Academy Lecture on Architecture, delivered by Professor Barry on the 30th ult. (see p. 133), the career of Sir Gilbert Scott was dealt with in reference to the Gothic revival. Sir Gilbert Scott might be considered a representative of an architectural revolution; he was a revivalist by taste as well as from conviction. He spoke of his love for Gothic architecture as "absolutely spontaneous," and he regarded Classic work as alien to our race and religion, and early in professional life identified himself with the new Gothic movement. The question might be asked, why have such violent revulsions of public opinion from the Classic Renaissance to the Gothic Revival? Why should not the progress of architecture be as gradual as in olden days, when changes succeeded each other as naturally as blooms follow buds? The answer must be that this is an age of freedom of thought. The time is past when men agreed to receive their policy, their religion, their architecture, from others. The "revival of letters" was an outburst of freedom, and if we will have liberty, we must accept its drawbacks. Those who think by repudiating revivals to obtain originality, indulge in a vain hope. Architecture is not free; she has a scientific as well as an artistic side, and must be useful as well as ornamental. A revival, if it be more than a passing fancy, must be called for by some new want to be supplied, or by some deficiencies to be atoned for. At the

time of the Gothic revival, both these conditions were present. A craving had arisen for something better than the then prevailing dreary bareness of churches, public buildings, and houses. Men began to turn to art as a civiliser and teacher; a revived earnestness in religion brought new forces into play, and everything became ripe for an architectural revival. Further, an age of ecclesiastical neglect had allowed our cathedrals and churches to fall into decay. A cry was now raised for the building of new churches and the repair and restoration of old ones, and Scott threw himself into the new movement with great energy. The movement would scarcely have advanced as rapidly as it did, if it had not been for the choice of Gothic architecture for the rebuilding of the Houses of Parliament. For this work it became necessary to train workmen for the various departments of stone and wood carving, encaustic tiles, decoration, metal work, &c. To educate workmen in Gothic principles of work, collections of casts and specimens were made, and Sir Gilbert Scott became one of the first and warmest supporters of the Architectural Museum at Westminster, an institution established with this object. The influence exerted by Pugin and his followers made itself felt in all the subsidiary pursuits which are allied to architectural design, and thus it became possible for architects to ensure the due execution of their ideas, in the style now coming into use. In secular as well as in ecclesiastical work some phase of Gothic was adopted. In the adaptation certain inconveniences were felt, and increased elasticity was desired. Some authors sought to attain these ends by mixing Italian and French peculiarities of detail with those purely English. The employment of large shafts in columns, and the partial abandonment of moulded, for plate tracery, date from this period. Sir Gilbert Scott did not, however, accept with any readiness such a modification of the revival movement. To him it was a national effort to revive the English forms of Medieval architecture. We may see traces of admixture of the foreign element in certain of his church fittings, but in his more important designs for buildings (always excepting the Albert Memorial in Hyde Park), he remained, as he began, emphatically an English architect. Neither by taste nor temperament was he an innovator. In his works we may see evidences of sobriety of taste and calmness of judgment. In his teaching in that room, Sir Gilbert enjoined a candid examination of the principles of diverse schools, and, added Professor Barry, "I cannot but adhere to this teaching, with this difference, that my distinguished predecessor's tastes had led him into the Medieval camp, while mine tend in the opposite direction. There can be no legitimate grounds for expecting success, on either hand, unless with devotion and enthusiasm, and a firm resolution to do your best." The name of Sir Gilbert Scott will ever be indissolubly associated with structures intended for ecclesiastical uses, and it is upon them that his fame will chiefly rest. No name will be handed down to our successors as much connected with recent restoration as that of Sir Gilbert Scott, and no one has been more vigorously, and, in many instances, more unjustly, assailed, in reference to this question of restoration. Mistakes will be made in all great movements. In so long, active, and laborious a career as that of Sir Gilbert Scott, episodes occurred, doubtless, which may not have commended themselves to his ripper judgment; but many of those who have been ready to listen to accusations of rashness formed an erroneous view of his character—of his painstaking habits, his calmness of judgment, his modesty, and his love for his art. A great architect stands forth before the world. His works are public property, at least as regards the right to criticise and assail them. His deeds are not like those of statesmen, lawyers, and other public men, whose mistakes are soon absolved, if not soon forgotten; nor can his failures be buried, like those of another profession. It may, perhaps, be whispered that even our greatest men do sometimes go astray; but the architect must be infallible. He is supposed to be bound to break a lance with all comers, and must be ready to defend works executed by him in the first enthusiasm of youth, as well as his achievements of yesterday. It is not necessary, however, to defend or apologise for the restorations of Sir Gilbert Scott. His works stand on their merits, and need no champion. But young architects do wisely to be cautious in

lending an ear to deprecatory anonymous criticisms. It is never difficult to find fault. The *suppressio veri* and *suggestio falsi* are twin-brothers of evil. No work of architecture that the world has yet seen is beyond criticism. How easy for any one to enumerate a string of faults, and shut his eyes, with wilful blindness, to merits and success. Criticism, to be useful, however, should be candid, and even generous. If you desire yourselves, said Prof. Barry, in conclusion, to obtain success and fame in your profession, do not believe that great reputations are lightly won, or easily supported. Do not expect that the goal is to be reached otherwise than by patient and laborious steps. Sir Joshua Reynolds declared "Students must therefore be told, again and again, that labour is the only price of solid fame, and that whatever their force of genius may be, there is no easy method of becoming a good painter." With a change of the last word, this doctrine will apply as fully to the architect as to his fellow-student. In no profession is steady application more required. You must not be discouraged at failure, and must be prepared for censure, when you have perhaps expected praise. The career of Sir Gilbert Scott was, in some respects, unique, and, in all probability, the exact circumstances of the revival which affected it can never recur. To you, as the younger standard-bearers of the profession, it may nevertheless supply encouragement. We may all determine that our noble art shall not suffer in our hands by any lack of devotion, hard work, and perseverance. Thus may we follow, though, it may be, at a distance, in the steps of the great men who have passed before, and thus may we endeavour to deserve, if it be not given us to achieve, success which may compare with theirs.

THE LOGIC OF ARCHITECTURAL DESIGN.

THE theatre of the Royal Institution was well filled on Friday evening, when Mr. H. Heathcote Statham delivered an address on "The Logic of Architectural Design." Mr. W. Spottiswoode occupied the chair. The lecture was illustrated by a series of large wall sheet-drawings; reduced copies of these, reproduced by photo-lithography, were handed as pamphlets round the room.

If I were asked, said Mr. Statham, to define in a single comprehensive phrase what is architecture, I should say, it is the art of building with expression. But, in order to proceed rightly to understand the limits and capabilities of this art, it is necessary to bear in thought that it differs from its sister arts in two important particulars. The first is that it arises out of the practical requirements of life, and must have a certain strength of construction; our houses must be such as to protect us from the weather, and so strong that they will not fall down. The other difference is that architecture has no direct reference to any of the external forms of nature. It relies in a great part for effect upon the observance of the laws of order, number, and proportion, and in this respect it rather resembles the art of music. Just as music depends on setting forth a harmony in chords of certain rates and with a definite rhythm, so does architecture. The musical theme is first displayed in the opening bars and then played with and repeated; and in the building the theme is in like manner set forth in the basement, and varied, repeated, and played with throughout the edifice. This comparison may be carried a step further; for when you have raised a line of building high enough a horizontal line is needed to indicate the termination, and so in music, when you have to repeat, a single chord is repeated several times to denote that there is no more to be expected in that direction. I believe that the fact already mentioned with reference to architecture, that it does not directly imitate the forms of nature, is one reason why there is such an absence of definite opinion as to what is right and what is wrong in architecture. If an artist should venture to depict a man with two heads, people would at once be shocked by the evident monstrosity; but if a man designed two towers or two entrances to a building which only required one, the redundancy would be just as wrong, only that the public do not take the trouble to think the subject out. What I wish to bring before you this evening is that architecture is the expression of certain wants to which it bears

a real relation. Only so long as you consider this relation of need and expression is it perfectly possible to estimate rightly whether a given building is worthy of commendation or otherwise. I don't propose, however, to evolve a logical architecture out of my own inner consciousness; I have thought it better to illustrate the progress of the art by examples on the walls, and to refer to some well known buildings as instances of what is right and what is wrong. Upon the walls you will see the elementary Doric temple of the Greeks drawn in half-elevation. You will see that it consists of a central cell enclosed in front by upright square beams; on these are horizontal beams separated from each other by short pieces of wood placed at regular intervals, and above these a raking cornice covered by roofing necessary to throw off the rain. Much of the character of the building is owing to the fact that Greece had a bright and sunny atmosphere. If this had not been the case it is very possible that the Greek column would not have existed—an illustration of the effect of climatic effect upon architecture. The first alteration to the square pillar seems to have arisen from the discovery that by taking off the corners of each post there was no diminution of the strength, while the removal of the angle allowed more light to pass through, and gave an appearance of lightness to the composition. From this point there was but a short step to giving sixteen sides to the pillar, only that when this was done, it was found that a square tile was wanted to form a firm seat underneath the beam carrying the weight of the roof, and this is the actual form in which the column appears on some well-known tombs at Beni Hassan, in Egypt. The sixteen facets hardly appeared sufficiently light, so the next process was to hollow out each of the faces, and in the earliest Doric buildings there is this simple hollowing out of a sixteen-sided pillar. But in a later phase of Greek art these sixteen "flutes" were increased to twenty, so that a point between the flutes should coincide with each angle of the covering tile or abacus. Then the column was diminished upwards—an instance of the metaphysical relation of architecture to nature. All natural objects taper from their base, and it is found that unless this rule be followed a column has a tendency to seem to be larger at the top than at the bottom. Next, a wide annulet was set between the column and the abacus, so as to form a capital, and just below this point several narrow incisions were cut round the column, with the object of stopping the upward lines and binding the whole together. These lines have aesthetically very much the same effect as the annular ligament which surrounds the wrist. Now, putting all these developments together, you get an object far more expressive of force and strength than the square pillar was; it has now a play of light and shade on its surfaces, and each decoration and ornament assists the expression. Now we come to the lintel or architrave, and this, as it has to carry the weight of the roof, is left perfectly plain. On this are set at equal distances a series of blocks, on each of which are scooped three vertical channels or "triglyphs," emphasising the fact that they bear a vertical weight. The spaces between were at first left empty, but afterwards filled with thin sculptured slabs, known as "metopes." Another beam is thrown over, and forms the lower member of a triangular tympanum or roof. The cornice projects sufficiently to keep the rain off, and is moulded so as to emphasise the construction. The whole of the building is thus seen to consist of a series of beams, and from this it gets the name of the trabeate style of architecture. The Romans threw the architecture of the Greeks into a melting pot for future ages to cast and coin from. They first brought the arch into play, although its powers had long been known. All expression was borrowed from the Greeks, and they continually used the column as a decoration although it carried no weight. Again, when they used a colonnade and strong arches together, they could not relinquish the idea that the feature must be completed by an architrave, frieze, and cornice. In modern times this fault has been frequently repeated, and London is full of instances. Another and more serious error was that in a series of round arches the line of pressure passed outside the vertical line. An arch is a system of wedge-shaped stones resting one upon the other, and kept up by the weight forcing them together at the base. In order that the arch may stand, the line of pressure

must pass within the supports, and this is not always an easy matter. The readiest way of doing it is to build thicker base walls; but this is very expensive both in money and material, and not always practicable. Another mode often adopted by the Romans was to build intersecting arches, and to throw the weight on the intervening space. When the Roman builders wished to vault in a building, this was comparatively easy if the space to be covered were square, for then they could throw cross vaults over, and the two arches met obliquely. But when they came to vault an oblong space, there was considerable difficulty. They met it by tilting the smaller arch, and the result was at the intersection of an oblique angle having a singular and unsightly twist. Against a vault they built a colonnade, and thus infringed the fundamental rule that the architectural design, both internal and external, should arise out of and express the scientific construction of the building. On the contrary, while the line of pressure from the vault is, as you will see the screen, oblique, the line of expression of the engaged column and its entablature is perpendicular. A third difficulty they met with is one which occurs in the use of the arch on a large scale in any style. When the space arched over is wide, the stones at the top become almost vertical instead of wedge-formed, and a very slight movement on the basement causes them to slip.

(To be continued next week.)

Building Intelligence.

BUCKLESHAM.—The parish church of Bucklesham was reopened on Jan. 31, having undergone restoration by Mr. W. G. Cunliffe, of Ipswich, from the designs and under the superintendence of Mr. William Smith, of 10, John-street, Adelphi, London, as architect. The cost has been about £18,000. The walls of the church throughout have been re-faced both internally and externally; in the latter case with flint work and stone dressings; while on the south side a small aisle has been added, separated from the nave by an arcade of three arches, as well as an organ chamber and vestry on the south side of the chancel. Besides the nave arcade, a new chancel arch has been inserted. The whole of the floor of the church has been raised a foot, while the chancel is raised another step, and two steps lead up to the altar. The roof is an open roof with arched pitch-pine principals springing from corbels, with moulded plates and purlins. At the west end of the nave is an oak-framed tower and spirelet in which the bell is hung. The church was formerly possessed of a west tower, and portions of the old stone-work of it were discovered in course of the restoration.

CHELMSFORD.—The new buildings of the Essex Industrial School and Home for Destitute Boys, just opened at Rainsford End, Chelmsford, were opened on Wednesday. The schools stand in an area of 10 acres, and are designed to accommodate 150 boys, besides teaching staff. The main building comprises two floors, and is E-shape on plan, with its back to the south. On the ground-floor of this longest side are placed a central entrance, and washing-room, with, on either hand, offices and stores, and offices for council. On the right of centre is the dining-room, in immediate connection with the kitchen department, and in the east wing an officers' dining-room, bakehouse, laundry, and stores. To the west of centre are lavatory and clothes-rooms in immediate connection with the playground. The west wing contains the schoolroom, 50ft. by 30ft., classrooms, punishment cells, and offices. On the first floor, over part of centre and west wing, are the workshops, reached by an external staircase and gallery from the playground, the schoolmaster's dwelling occupying the rest of the west wing. The general dormitory is 121ft. by 34ft. 6in., with an average height of 15ft., approached by staircases in centre and at east end. An infirmary, and matron's and resident officers' rooms are also provided. The building will depend for external expression entirely upon grouping and proportions. The walls are faced with stock bricks, enlivened by a few bands of red, and the roofs are covered with Major's angular corrugated tiles. The architect was

Mr. W. Stock, county surveyor; the contract for the school-building proper has been carried out by Mr. S. Parmenter, and that for the lodge and manager's house by Mr. S. Fincham, of Chelmsford. Water is supplied from a well on the premises; the chief parts of the building are warmed by hot-water pipes, supplied by Messrs. T. H. P. Dennis and Co., who gave the boiler. The total outlay has been £14,000.

ISLE OF MULL, N.B.—A new Free Church was opened at Tobermory on the 4th of January last. The style is Early English. The building, which is heated with hot-water pipes, is seated for 450, and has cost about £3,000. The architect is Mr. John C. Hay, of Edinburgh. Situated in the centre of the street which runs along one side of the beautiful little bay, the church, with its tower and spire 100ft. high, is a decided ornament to the Highland town.

METROPOLITAN BOARD OF WORKS.—On Friday this Board granted applications from the Vestry of Hampstead for permission to borrow the further sum of £1,500 for the erection of a vestry hall, and £3,000 for sewerage works. An advance of £2,000 was made to Wandsworth Vestry to purchase a vestry hall and parish offices, and one of £7,000 to the churchwardens and overseers of Bromley St. Leonard, for purchasing a site, and building a vestry hall and parish offices. A draft specification for paving works, &c., in connection with the Whitechapel and Limehouse Artisans' Dwelling scheme, were approved, and tenders were ordered to be invited.

PADDOCK.—All Saints' Church, Paddock, was re-opened on January 27, after restoration at a cost of £3,500 under the care of Messrs. John Kirk and Son, architects, of Huddersfield and Dewsbury. The old vestries and east walls have been entirely removed, a new chancel and vestries built, and the south-west porch pulled down and enlarged. These additions have been designed in the Early English style. The whole of the nave has been re-seated with pitch pine benches. The old ceiling of the church being a flat plastered one, polished pitch pine hammer beams, with tracery panelling, have been inserted. The old font has been re-dressed and removed from its original situation, and fixed in an alcove made for its reception in the tower. The ambulatory and centre aisles are laid with ornamental tiles, as is also the floor of the chancel.

PRESTON.—The Roman Catholic Church of St. Augustine, Preston, was reopened on Sunday, after improvements, carried out at a cost of £2,000. The interior has been decorated by Mr. James Smith, of Lark-hill, Preston. A new sanctuary has been added, measuring 33ft. by 30ft., and semicircular in form. Round it runs a dado of Staffordshire and Derbyshire marbles, and in them are inserted four paintings by Mr. Rossi, each 3ft. by 6ft., and representing "The Giving of the Keys," "The Raising of Jairus' Daughter," "The Taking of the Fishes," and "The Marriage at Cana." Above the dado rises an arcade in which are five frescoes, each 10ft. by 8ft., from the brush of the same artist. In the centre of the sanctuary is a large marble altar, and on the reredos is a carving of the Last Supper. The canopy over the altar rises to a height of 25ft., ending in a dome, around which cluster 6 angels in statuary marble. All the marble work, and the altar, have been executed by Mr. T. Sherrott, of Preston. The old benches in the church have been replaced by new ones of polished pitch-pine and modern design, from the workshop of Mr. Thomas Baines, of Preston.

SANDRINGHAM.—The Rectory House of Sandringham is evidently of old date, and has been added to from time to time by the various incumbents, the result of which was an incongruous pile. Last year the Prince of Wales decided to have it enlarged and thoroughly renovated internally. In pursuance with instructions, a new study and kitchen offices have just been added, a new hall and staircase in pitch-pine, and various other alterations to improve the interior. The walls are built of brick, and faced with the car stone peculiar to the locality. Some of the stoves and mantelpieces were from Messrs. Barnard, Bishop, and Barnards. The whole of the works were executed by the estate workmen, under the superintendence of Mr. C. Smedley Beek, architect, of Norwich.

SUNDERLAND.—The new church of St. Stephen's, Ayres-quay, which was erected last year from de-

signs by Messrs. Austin, Johnson, and Hicks, of Newcastle, has just been opened for public worship. The style is Gothic, of rather alate type; and the building is constructed of brick throughout, with stone mullions and tracings to the windows. The church consists of a chancel about 40ft. by 25ft., a nave 80ft. by 29ft., an organ chamber north of the chancel; and a vestry and parish room is formed under the chancel. There are no aisles; but owing to the inclination of the site a capacious schoolroom and vestry has been obtained underneath the chancel. The roof, which is very high pitched, is covered with red Staffordshire tiles, and the long straight line of ridge is broken by an octagonal bell turret above the chancel arch, of open woodwork surmounted by a lead-covered spire. The contractor for the masonry was Mr. W. Scott, of Sunderland, and the whole of the woodwork, including carved pulpit, lectern, and altar rails of wainscot, and seats of pitch pine for nearly 500 persons, is by Mr. F. Caldecleugh, of Durham. The cost of the church, including site, is about £6,500. The metal work was supplied by Messrs. Jones and Willis, of London and Birmingham.

THIRSK.—The Burial Board for Thirsk, at a meeting on Tuesday week, received about forty tenders for the construction of a cemetery, including the erection of chapels for Episcopalians and Dissenters. Each chapel will be 35ft. by 18ft., capable of seating about seventy persons, with an octagonal bier porch at the north end. The site is about 100 yards to the north-west of the vicarage, on the road leading to Newsham, the area of which is 3 acres, but more can be added if desired at any future time. The chapels will stand parallel with each other in the centre of the ground, and about 15 yards apart. There will be an entrance lodge, with Board Room. The buildings will be Gothic in character, built of brick, with Thimbleby stone dressings. The site will be enclosed with a fence wall, finished with a neat stone coping and iron palisades, and ornamental entrance gates. The whole of the works will be executed from the designs and under the superintendence of Mr. Wm. Bell, architect and surveyor, of Thirsk.

The second course of Canter Lectures at the Society of Arts this session will be by Dr. W. H. Corfield, M.A., on "Dwelling-houses: their Sanitary Construction and Arrangements." It will consist of six lectures, to be given on the following dates:—Lecture I. (February 17)—Situation and Structure of House.—Drainage of soil, foundations, walls, roof, rain-water pipes, &c. Lecture II. (February 24)—Ventilation, Warming and Lighting.—Size of rooms, overcrowding, ventilators, stoves, lights, &c. Lecture III. (March 3)—Water Supply.—Sources, systems of service, cisterns, pipes, filters, &c. Lecture IV. (March 10)—Removal of Refuse Matters.—Dust, kitchen refuse, earth closets, &c.; conservancy and water-carriage systems compared. Lecture V. (March 17)—Sewerage.—Main sewers and house branches, traps, ventilation, &c. Lecture VI. (March 24)—Water-closets, Sinks, and Baths.—Arrangements of pipes, traps, &c. The course will be illustrated by specimens and models from the Parkes Museum of Hygiene.

Dr. J. S. Phené delivered a lecture on "Cyprus" at Sion College, on Tuesday evening, in which he described the past history of the island, and the rock-cut tombs to be found at Paphos and Paphos. He stated that he had found abundant traces of sun, planetary, and serpent worship, and that the truncated mountain peaks and saurian and human similitudes traced by cairns and avenues of stones, corresponded to other remains which he had previously identified with this worship in the Western Highlands of Scotland, in Brittany, Greece, India, and with the snake mounds of America, proving the universal spread of the worship of the Enemy of mankind under the similitude of a serpent. If the cedars, pines, and cypresses which formerly clothed the island with magnificent forests were replanted, the lecturer predicted that it would soon become healthy and be blessed with more regular rain; the old harbours sought to be reopened, and the whole land restored from its present state of degradation. The lecture was illustrated by a number of water-colour sketches of scenery, plans and sections of the rock tombs, mystic caves, and serpent circles, and specimens of ceramic ware.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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A VICTIM. (We hardly see what other course is open to clients. Somebody's decision must be final, and the engineer is most likely to be the disappointed party. We quite agree with you, however, as to the frequency with which ignorant and unscrupulous people get entrusted with the direction of works; but respectable contractors should refuse to tender in such cases.) CAUTION. (He is legally entitled to the drawings.) G. L. (See Answers to Correspondents on p. 78.)

"BUILDING NEWS" DESIGNING CLUB.

J. S. (As regards your suggestion, we shall always exercise a primary regard for good construction, though the stricture you make as to the kitchen chimney in the design we published last week may be applied to hundreds of well-constructed houses. The flue is carried on an arch, and there is nothing to prevent an easy bend.)—S. Y. D. (The walls had better be battened and the tiles fixed to the battens.)—CIVIS. (We can recommend you a work by Mr. Talbot's "Ancient and Modern Furniture," to be obtained by Messrs. Batsford, Holborn.)—DRAWINGS RECEIVED.—"Agmon"—"Dunwich."

Correspondence.

PICTURESQUE ARCHITECTURE.

To the Editor of the BUILDING NEWS.

SIR,—All recognised canons of good taste and sound criticism agree in excluding from the pale of the true picturesque those foolish fabrications—constructed ruins; the sentiments attaching to intentional imperfection and designed dilapidation being utterly opposed to those connected with the effects of natural decay.

How, then, stands the case with designs, professedly architectural, in which the effect aimed at seems very analogous to that of an artificial ruin—in which discordant elements of diverse styles are linked together, as though through some accident of repair or reconstruction—in which debased Gothic and corrupted Classic unite their uncouth details in "most admired confusion," and in which features foreign to the uses of the building are dragged in neck and heels (at no small cost of money, see you) to produce novelty (aye, indeed!) and to vary outline? Is this architecture in the proper sense of the word? Is it real art in any sense?

You seem to give a decision in the affirmative under that powerful pronoun, the editorial "We," in the admiration you express for the design for

the Church of St. Michael, for the Bedford Park Estate; and if I venture in your own columns to raise debate on the point, I cry you mercy; it may be but the expiring whine of a moribund senility, so I pray you let an old crow have his croak!

On the grounds expressed above, I question this being architecture, which, as I began to learn it—alas! more than forty years ago—and have been learning it ever since, I have grown to understand as beauty and excellence of form and construction, guided by system (which implies harmony—at least, if not unity of style) and allied to utility. Perhaps I am quite wrong in such ideas of our art, and modern examples would seem to prove me so; but if perchance I am near the truth, how does such a design as that named abide the test? I will not recapitulate the characteristics which I have assigned to it, nor will I question the cleverness with which, as we might expect from its author, its very varying parts are put together. Why, however, I would ask, should a new church have a debased Tudor window at one end and a Georgian stable circular one at the other, and the bell-cot of the same stable seemingly between the two? What is the gain of that everlasting "cove" (repeated *ad nauseam* from the time of its reappearance in those City Chambers) whose effect depends on height and distance, but here brought down close to the eye? And what, in the name of all the Muses (for I forget at the moment who of them takes charge of architecture), is a "balcony" (?) wanted for on the side-aisle roof of a church? I waited with curiosity for the promised plan of this church, if haply it might give a clue as to how the balcony is to be got at, but the plan came not, and my marvel yet abides. If meeting this design in the boudoir of some worthy lady, in the shape of a paper model given by some neat-handed granddaughter or niece, one would exclaim, "How pretty," and "How funny!" and so leave it; but it is otherwise when it comes out as a serious design for execution (ominous word!)* My attempt to criticise it is ended. It may be that as a sexagenarian (and something more) I am past the appreciation of these later "revivals" (?) of 17th and 18th century "work." I confess to this, and then of course, "what can it matter what such an old noodle says?" So I had better spare my pen and your patience, and at once subscribe myself, as your readers (of the "revival") will certainly dub me,

Jan. 29th. AN ARCHITECTURAL FOGGY.

ENGLISH AND AMERICAN LOCKS.

SIR,—In your issue of the 17th ult. you comment upon a letter on above subject which appeared in the *Times*, addressed by me to the Hon. Colonel Wrottesley, R.E. In that letter I incidentally alluded to Messrs. Chubb and Son, and I notice in your issue of the 24th ult. that they traverse some of my statements respecting machine-made locks. As their remarks are calculated to depreciate the quality of the locks under discussion, perhaps you will kindly allow me a sentence or two in explanation.

I quite agree with Messrs. Chubb that it is not desirable to make a large quantity of locks with keys precisely alike; but, with all due deference to them, I cannot see that they are warranted in concluding that it is assumed by either Colonel Wrottesley or myself that "all English locks are of one class, consisting of a number of small parts, exact counterparts of one another." It does not follow, because locks are produced wholly, or partially, by machinery, that the keys should necessarily have little or no variation.

Messrs. Chubb also seem to labour under the impression that I sell the common American locks, and those only, although I stated in the *Times* that I had "no great faith" in such locks; that they were only intended for the cheap "wooden houses of the States," and that I did not buy "the purely Yankee goods." I may be allowed to say, therefore, that the special locks I sell of American manufacture differ in the keys to a far greater extent than those of the same class made in this country at higher rates. Singularly enough, it so happened that the same morning on which Messrs. Chubb's letter was published an order came by post for a school at Tunbridge for 36 of the "Anglo-American"

* I see the wood-work is to be painted green, possibly for "symbolical reasons."

locks, with keys to differ throughout, and I was able to execute the order at once from stock.

The same may be said of a large order which I executed for the War Department for Cyprus, whereas the English locks I formerly had of the same class only differed in half-dozens (or up to 6 variations) unless specially made otherwise, and at an extra price.

It is, therefore (to use Messrs. Chubb's own words), "most unfair" for them to class the "Anglo-American" locks in question among the common goods, "with little or no variation," which I had previously condemned.

With respect to Messrs. Chubb's workmen, I am pleased to find that they may be included among the "credible exceptions" quoted by me in the *Times*; but, considering that I mentioned Messrs. Chubb as one of the exceptional lock firms of this country, I really cannot see that they have much ground for complaint unless it be that they are anxious to defend the cause of their "weaker brethren," in which case their action is decidedly magnanimous.—I am, &c.,

JAMES HILL.

Upper Thames-street, London, Feb. 4.

HOUSE CLASSIFICATION AND REGISTRATION.

SIR,—We class and register our ships; might it not be a good plan and to the public advantage to do the same with our houses?

As regards drainage and water supply, a house could be classed under several heads, according to the style and quality of its fittings, e.g.—

A 1. class house has all drains, soil, and waste-pipes outside of the house, and the soil and waste-pipes and rain-pipes separate and debouching into ventilating siphon-traps at their foot, and each also ventilated properly at the top. The drain to be also trapped off from the sewer by a ventilating siphon trap, and ventilated at its higher end. All the water supply for culinary and drinking purposes to be off the main direct.

A 2.—Drainage same as above, but water supply off cisterns having no connection with water-closets, said cisterns being properly placed, and to have lids and block-tin self-acting overflows to keep out dust.

B 1.—Drains wholly or partly through house, but these and the pipes properly fitted in, trapped, and ventilated. Water supply off the main.

B 2.—Drains as in B 1, but water supply off cisterns as above.

C 1.—Drains going through house, and only partly trapped and ventilated, drain gas going up soil or waste-pipes, and not in a satisfactory condition. Water off main.

C 2.—Drains as in C 1, but water off cisterns.

D 1.—Drains going through house, and neither trapped nor ventilated properly. Water off main direct.

D 2.—Drains as in D 1, but water supply off cisterns, and so on with the other styles of fittings.

The higher classification the house would get, it would stand a better chance for selling well in the market. I have been asked to give certificates myself; but if some acknowledged standard were made out by the authorities, such would be, I believe, of immense service.—I am, &c.,

W. P. BUCHAN, Sanitary Engineer.

SEMI-DETACHED VILLAS.

SIR,—There can be no difference of opinion as to the importance and difficulty of the problem you have set before your readers, and having given considerable attention to this subject, perhaps you will allow me to indicate various points to which attention should be directed in planning, and which I find experienced tenants regard as important to the comfortable occupation of this class of houses, and as economising repairs, furniture, and domestic labour.

1. The domestic offices (including coal-cellar), should be on same level as living-rooms, and easily but not directly accessible from dining-room stairs and entrance.

N.B. A service door is preferable to a hatch, as requiring but one servant instead of two, and should be shut off from the staircase and hall.

2. The bath-room and w.c. should be distinct, easily, but not obviously, accessible; against an

external wall, but not adjoining any door or over any principal room.

3. The minimum of passages.
4. No rooms lighted from the side.
5. The minimum of external doors.
6. A roomy entrance, with space for hats and coats, and for a perambulator (this last is an important point, invariably overlooked).
7. The larder and stores should be accessible without necessarily passing through kitchen.
8. A copper in scullery (not in kitchen).
9. The kitchen range lighted from the side.
10. A water supply to bed-room floor.
11. The stairs to be screened from the front door and to be sufficiently easy of ascent.
12. A tradesmen's entrance at side.
13. A through side passage for convenience of dustmen, gardener, coal, &c.

14. The back garden not to be narrowed by too great projection of offices, or its privacy diminished by being overlooked thereby.

15. A minimum of flats and valley gutters. Sanitary and other matters, more of detail than plan, need not here be gone into.

After the well-considered design for a detached villa by "S. in a Circle," one is disappointed at his plan for a semi-detached villa, published in your number of the 31st. The plan is evidently carefully thought out, and many of the points above have been fairly met; but it remains open to obvious objections. There is no wall space for hats and coats; the back garden is narrowed to a width of 1 ft., and commanded by the servants' department; there are no less than four external doors; much waste of space in passages; all dust and garden materials must be carried through scullery; and the design could not be carried out at 6½d. a foot. The service arrangement is comically like the Irishman's bottomless sedan chair; except for the look of the thing, it would be easier for Mary, having already brought the dish and its odours into the staircase hall, to carry it through the dining-room door instead of handing it to Jane through the hatch; and although winders may be difficult altogether to dispense with without sacrificing more valuable space, yet 7½ in. riders and for-winders to a quarter space are unnecessarily inconvenient. I cannot, however, object to the scullery side-light, as the other alternative, viz., its window overlooking the garden, would be a greater evil, and in any case a tradesmen's side entrance is necessary, and the overlooking objection can be easily met by raising the division fence.

The general arrangement of the plan is probably the true one, and if the unnecessary and offensive ground-floor w.e. were dispensed with, and the entire side block brought forward, most of the objections I have named would disappear in the re-arrangement.

The problem cannot however be yet regarded as at all settled, although no doubt the attention you have called to it will bear good fruit.—I am, &c., C. M. STEDMAN.

An enquiry was recently held at Woodford, South Essex, before Mr. S. J. Smith, C.E., Local Government Board Inspector, respecting an application from the Woodford Local Board for sanction to borrow £1,800 for sewerage works.

Intercommunication.

QUESTIONS.

[5669].—**Responsibility of Clerks of Works.**—Will some of your numerous readers throw any light on the responsibility legally resting on a clerk of works? I will state a case thus:—Suppose a clerk of works having the superintendence of a building under the direction of the architect, and he is furnished with correct copies of plans, schedule, and specifications, by the architect. The clerk of works is appointed to attend to the interest of the employer in whose paid service he is, while so employed—as clerk of works—to see that the contractor fairly executes his contract according to plans, &c., and to the entire satisfaction of the architect, and according to the true intent and meaning of the plans and specifications. A clause, as usual, is in the specifications by which the contracting parties are bound to submit all disputes arising from the contract to the architect, who shall be sole arbiter between them. The contractor proceeded to execute the works, but does so totally different from the plans, and his materials and workmanship of an inferior kind, and contrary to those provided. The structure falls, and a dispute thus arises between the employers and the contractor. A reference is made to the arbiter, who summons both parties to appear before him. They accordingly appear by agent and counsel, the case is fully investigated, and the arbiter finds the contractor failed to execute the works according to plans, &c., and decides against him with expenses, and ordains him within a reasonable time (named), to take down the fallen structure and re-erect it according to the plans, &c. In the case of his failing to do so he directs the employer to do so at his expense, the architect not being paid in the ordinary way by commission on the cost of the works, but by fees. The clerk of works allowing the building to go on contrary to the plans, &c., as before stated, only reports the matter to the architect when the building gives way. The faulty building is removed by the clerk of works, at the instance of the employers (in terms of the arbiter's finding), and reconstructs it according to the plans, &c., and it is now a substantial and secure structure. The question is, On whom does the responsibility of the failure of the first structure rest?—A CONSTANT READER.

[5670].—**Laundry Drying Closet.**—I am desirous of building a drying closet to my laundry, 11 ft. x 8 ft. and should be glad if any of your readers would kindly give me some information respecting the fitting up of same, such as best method of heating, clothes-horses, ventilation, &c., or reference to any plates or drawings illustrating same. I may say there will be no room or chamber over the closet. Replies will oblige.—BAR or SOAP.

[5671].—**Storing Rain-water.**—I shall feel obliged by some reader of the BUILDING NEWS kindly informing me what size tank would be necessary to store the rain-water from about 2,182 feet sup. of roof area. I know that the rainfall for a year averages about 18 in. in depth per foot, but I am not certain how I should allow for the quantity of water taken from cistern for use of house. Full particulars will oblige.—PECKSIR.

[5672].—**Fire.**—In back numbers of this journal, questions have been asked on more than one occasion as to the means of distinguishing between the various species of fire; but the answers have, for the most part, been that practice is alone the method of acquiring it. In the Honours examination in building construction of the Science and Art Department, questions are given nearly every year which necessitate a knowledge of how to distinguish the fire when worked up. It has occurred to me that if the replies given in this journal be correct, it is manifestly unfair to give questions on a subject in which practical experience alone guides one. As I intend sitting at the coming examination, I shall be much obliged if any one will kindly help me either by giving me information on the subject, or by mentioning a book which treats of the matter.—A. S.

[5673].—**Sand Piles.**—In your "Commonplace Column," in the number for 31st January, article "Foundations," it is recommended to bore holes in the earth, and to fill those holes with sand in preference to using piles of wood when the ground is soft. This suggestion is frequently repeated in books; but in the course of a pretty long professional experience, I have never seen it put into practice, nor heard of the plan being employed.

May I ask to be informed where, and by whom, this navigable river in which I am about to make some important improvements. I should like to reduce all my levels to ordnance datum. There are several bench marks of the Ordnance Survey in my locality. Can any reader inform me how I can obtain the heights of them so as to be able to connect my levels with them.—BETA.

[5674].—**Ordnance Datum.**—I have charge of a navigable river in which I am about to make some important improvements. I should like to reduce all my levels to ordnance datum. There are several bench marks of the Ordnance Survey in my locality. Can any reader inform me how I can obtain the heights of them so as to be able to connect my levels with them.—BETA.

[5675].—**Planks, Deals, and Battens.**—Will some reader, through Intercommunication Column, inform me how to distinguish 1st from 2nd and inferior qualities of Archangel and Petersburg planks, deals and battens. They are not branded at the ends like Swedish and other goods, but merely stamped, I believe, with a small letter. Perhaps someone will also kindly inform me where I can get the weekly current prices of wood goods.—COUNTRY BUILDER.

REPLIES.

[5636].—**Porous Bricks.**—"Z. X. Y." will find that the sediment from the water will soon stop the pores in any porous bricks he can get and render them impervious. If he wants to filter the water, he should use the material of the Selenite of Iron Filtering Company.—A. W. WALLACE, M.D.

[5646].—**Condensation on Walls.**—This is of constant occurrence in the South of Ireland. It is caused by the wall getting cooled below the dew-point of the warm, moist air which comes in on a change of weather. It can be remedied by lath-and-plastering the wall, or otherwise covering it with a non-conducting substance which will prevent the cold of the wall coming to the surface, or by keeping fires in the bedroom during cold weather, so as to prevent the walls getting cooled.—A. W. WALLACE, M.D.

[5647].—**Glass.**—The glass used for white gas globes is called opal glass, and can easily be procured in flat sheets at any glass warehouse.—WILLIAM RAMSEY.

[5652].—**Cast of Carvings.**—Mr. Harry Hems' *modus operandi* should have had a little more detail, I think; otherwise the operator will find himself in "a fix" when he attempts to pull away the clay. Having prepared the clay as instructed by Mr. Hems, the operator should examine the carving, and see if there are any undercuttings; if so, they should be first filled up or squeezed, so that standing at right angles to the carving, all the surface can be seen. The exposed portion of these pieces should be dusted over by taking up dust on the end of a brush and putting it on the clay, this will prevent the general squeeze from sticking to, or disturbing the undercutting pieces, which should be taken out separately with a knife or modelling tool, and placed on the inverted squeeze in their proper places; you can then proceed as described by Mr. Hems. Should the squeeze be large, it should be covered with a coat of plaster to keep the clay from warping, and to assist in taking it away. In squeezing wood carvings, tissue paper is often used with advantage: it prevents, in some measure, the particles of clay being pressed into the pores of the wood.—H. TENAX.

[5653].—**Casting Plaster of Paris with Gelatine Moulds.**—Gelatine, I find, is best made from Russian and common glue in equal parts; to harden same, add 10% of Canada Balsam to each 1 gallon of gelatine when dissolving; in using gelatine the casts want taking out as soon as the plaster is set, as the heat of plaster, if allowed to stay in too long, will take the face off or make it soft and pappy. Allow sufficient time to cool down before refilling.—O. LISTER.

[5663].—**Plain Tile Floors.**—I have no doubt the houses referred to are very old; if so, the laths and nails will be decayed. And the mending on the roof to repair them, if not experienced men, would do more harm than good. The appearance may seem to be good. I once went on a roof of that description; but, to my surprise, the tiles and laths gave way, and I very soon found myself on the ground again more frightened than hurt. If the houses are of modern erection, the fault will most probably be in the gauge of the tiling being too great, which is often done by jerry builders. In such case, the only

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cure is to strip the roof and re-lath and tile the same at a proper gauge, say not more than four inches; and properly touched underneath with hair mortar, will make a perfect cure.—PRACTICAL TILER.

Our Office Table.

THE 53rd annual exhibition of the Royal Scottish Academy was opened in Edinburgh on Saturday. The number of works exhibited is 1,078, being four fewer than last year. Among the chief pictures by members of the Academy are Mr. Herdman's "Charles Edward Seeking Shelter in the House of an Adherent," a striking illustration of the story of "Abnashar," by Mr. Lockhart, and "The Retreat from Moscow," by Mr. Gibb, one of the newly-elected associates. The pictures from a distance embrace Mr. Leslie's "School Revisited," Mr. Orchardson's "The Queen of Swords," and "The Social Eddy," and a picture by Mr. Alma Tadema, entitled "After the Audience," which occupies the central position in the great room. The president, Sir Daniel Macnee, has portraits of Sir James Bain, painted for the corporation of Glasgow, the Duke of Buccleuch, the late Mr. Samuel Bough, and Professor Balfour, of the University of Edinburgh. Among the sculptures is a marble bust, by Sir John Steell, of the late Lady Anna Stirling Maxwell, commissioned by the late Sir William Stirling Maxwell. Mr. Mossman has a colossal marble bust of the late Rev. Professor Eadie, of Glasgow; and there are also works by Mr. B. Nodie, Mr. George A. Lawson, Mr. D. W. Stevenson, Mr. John Hutchinson, Mr. Charles M'Bryde, and others. The total sum realised through the sale of pictures on Tuesday was £2,101, as compared with £1,701 on the opening day last year.

The annual conference of the General Alliance of Operative House-Painters is being held during the present week at Hanley. The meeting opened on Monday, when about fifty delegates were in attendance. The annual address was given by the President of the conference (Mr. Sumley), in which he disputed the assertion which they continually heard, that trades unionism was driving trade from the country, and prevented the development of the national resources. Arbitration was one of the fundamental principles of their society, but there were questions upon which it was impossible for them to arbitrate. He announced the accession of 1,100 members to their society during the past year, and referred to several of the subsidiary objects of the society. He said trades unionists were much indebted to Mr. John Morley for his able and exhaustive address on over-production, and to Mr. Macdonald, M.P., for introducing his Bill for compensating servants injured in the service of their employers. This Bill was of especial value to painters, whose work often placed them in jeopardy. He had not the slightest sympathy with the perpetrators of the diabolical outrages which had been committed during the recent strike in the cotton districts, and he earnestly hoped that such acts would

never again be witnessed in this country. Setting law and order at defiance must destroy the cause of any workmen.

A MEETING of artists was held on Saturday, at the Grosvenor Gallery, to consider the question of artistic copyright, as it would be affected if the recommendations in the report of the recent Royal Commission were adopted by legislation. A resolution was adopted to the effect that while the report of the Royal Commission exposed the defects of the existing law of artistic copyright, the meeting was of opinion that the interests of the public could be as adequately secured by means less injurious to the interests of art. A second resolution was also adopted as follows: "That in the absence of express stipulation the purchase or acquisition of a work of art should not carry with it the right of reproduction, but that such right should in all cases remain vested in the producer until he has specifically parted with it. It is, however, expedient for the security of purchasers and the public that this general principle should be subject to the following limitations—1. That the suggestion of the Royal Commissioners in relation to photographic portraits on commission should apply to all portraiture, and that the author of a portrait executed on commission should have no power to do anything in the exercise of his copyright without the sanction of the person who ordered it. 2. In regard to *replicas* made by the artist himself, that the possession of copyright should not be held to entitle the author of a work of art to make copies thereof in the same material, and of such close resemblance in other respects as to imperil the identity of the original work, and thereby to lessen its value." A resolution declaring that registration would prove a vexatious and ineffective mode of protection for the design in works of imaginative art was proposed by Mr. Herkomer, seconded by Sir F. Leighton, and adopted. A committee consisting of Mr. Fripp, Mr. Richmond, Mr. Albert Moore, and Mr. Herkomer was appointed to carry out the objects of the meeting. We have heard on good authority that the Royal Academy contemplate a memorial to the Government on the subject of artistic copyright.

It is proposed to establish a Society, to be called the "St. Paul's Ecclesiastical Society," for the non-professional study of Ecclesiastical Architecture and design. Members will visit churches under the direction of professional architects; frequent meetings will be held, at which lectures and papers on architectural subjects will be read and discussed. The first meeting was held in the Chapter House, 68, St. Paul's Churchyard, last night at 7 o'clock, when the rules and other matters connected with the society were brought forward for consideration. The Dean of St. Paul's has consented to become president. Mr. Penrose, Surveyor of St. Paul's Cathedral, has promised to conduct the members over St. Paul's; Mr. Randall Druee has kindly offered to give the members a systematic description of the contents of the Royal Architectural Museum, Westminster, in chronological order. Mr. R. Howard Wall is the Secretary, *pro tem*.

A MONOGRAPH, consisting of a history or architectural description and complete drawings of the Abbey of St. Andrew, Hexham, is about to be published for subscribers only by Mr. Charles Clement Hodges, of Barnsley. We have seen several of the drawings for this volume, and they bear evidence of much careful work and study. The plates (which are photo-lithographic reproductions of the author's own drawings) will comprise plans, elevations, sections, details, and perspective views both of the church itself and the remains of the domestic buildings of the abbey. The church of Hexham Abbey is equalled by none in the county of Northumberland for scale and architectural interest. Monographs of the kind now promised by Mr. Hodges deserve the support of the profession, and ultimately become exceedingly valuable records of buildings either no longer remaining or "thoroughly restored." We hope to return to Mr. Hodges' book later on.

THE important question of water supply to our large cities will, it is to be hoped, receive great attention in Parliament this session. Both Lancashire and Yorkshire will move in the matter, and the utmost efforts will be made to bring about an improvement now long demanded. Mr. Edward Howard will move for a select committee of inquiry on the subject. The scope of his proposed investigation will embrace the water supply of the manufacturing districts of both the counties mentioned. He is personally disposed to adopt whatever means may be deemed requisite to meet the existing difficulty, but before agreeing to any large measure of reform he desires full inquiry. The Thirlmere scheme attempted to be carried out by Manchester last year having drawn his attention more immediately to the subject, he will ask the Select Committee if it be appointed to decide how far it is necessary or expedient to lay the Cumberland and Westmoreland lakes under contribution. The Thirlmere scheme will again be fought bitterly, whether or not its progress delayed by the contemplated action of Mr. Howard.

MR. GLADSTONE draws attention in the *Guardian* to a plan now on foot for the restoration of the ancient and venerable, though small, cathedral church of St. German's, in the Isle of Man. The great antiquity of the see and the site may make the church, which is of the thirteenth century, seem modern in comparison; but it presents an assemblage of remarkable features which invest the scheme with more than a local character. Its restoration would fill a palpable void, as the see of Man is at present without a cathedral. The present Governor of the Isle of Man, with a view to the restoration of the ancient cathedral, has had, within the last three years, the principal arches under the central tower, together with the external walls of the building, repaired and secured under the superintendence of Mr. Anderson, well known in connection with the works at Jedburgh Abbey and the cathedral of Iona. The Governor has also obtained designs for the complete restoration of the cathedral, which Mr. Anderson estimates can be effected at a cost of £10,000.

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CHIPS.

Mr. Ruskin's costs are already raised; they are estimated at less than £400. Many working men have contributed their shilling.

A stained-glass window is to be erected in St. Margaret's Church, Westminster, in memory of the late Lady Hatherley.

The Wandsworth District Board of Works have accepted the tender of Mr. Beevers for the execution of all masonry and pavements' work in Clapham, for a term of three years, in accordance with a schedule of prices.

The town commissioners of Ennis have obtained a loan of £11,000 for the construction of waterworks for supplying the town with pure water.

The Town Commissioners of Queenstown adopted on Monday the scheme of Messrs. O'Keefe and Jackson, civil engineers, for proposed waterworks, and authorised them, in conjunction with a third hydraulic-engineer to be hereafter appointed, to prepare the necessary plans, sections, and books of reference.

A new system of water-supply was publicly inaugurated at Romsey on Thursday in last week. It has been provided by the South Hants Water Company, who have also just supplied several villages in the neighbourhood, as well as the suburbs of Southampton.

The Prime Minister has appointed Sir Richard Wallace, Bart. K.C.B., M.P., to the vacant Trusteeship of the National Portrait Gallery.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. John Pennethorne, on "The Connection between Ancient Art and the Ancient Geometry, as illustrated by the Works of the age of Pericles." 8 p.m.
Society of Arts. Dr. B. W. Richardson, on "Further Researches in Petrographic Changes." 1 p.m.
TUESDAY.—Institution of Civil Engineers. Discussion on "The Geology and Sandhurst Water Supplies." 8 p.m.
WEDNESDAY.—Society of Arts. J. Halloway, on "An Application of the Bessemer Process to the Reduction of Metallic Sulphides." 8 p.m.
THURSDAY.—Civil and Mechanical Engineers' Society. James Lowe, on "Fracture of Iron." 6.30 p.m.
Society for the Fine Arts. C. J. Griffiths, on "The Art of Wood Engraving at the Present Day." 8 p.m.
Society of Arts. A. O. Phillip, on "Noxious Vapours." 8 p.m.
FRIDAY.—Architectural Association. R. Phené Spiers, on "The International Congress of Architects at Paris." 7.30 p.m.

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"And will, in our opinion, supersede any other similar system before the public."—*The London News*.

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Trade News.

WAGES MOVEMENT.

ADVERTISING.—A number of masons in this town are on strike against a proposal of the masters to lengthen the working hours by two per week.

BARNSLEY.—The Master Builders' Association of Barnsley have served a notice upon the representatives of the men's union of their intention, dating from the latter end of January, to alter both the wages and working hours of the men in the town, and this of course will affect the whole of the men employed throughout South Yorkshire. At the present time they are paid 6s. 6d. per day for five days in the week and 3s. 6d. for Saturdays. The masters propose to pay the whole of them by the

hour instead of by the day, and will ask them to work 55 hours a week, instead of 49½, as is the case at the present time. The alteration in the mode of payment, it is stated, will amount to a reduction of 4s. per week. The alteration in the scale is to take effect in May, in accordance with a resolution passed some time ago binding both masters and men.

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TENDERS.

BEXHILL.—For the restoration of the parish church. Mr. W. Butterfield, architect:—
Gaskin of Canterbury (accepted) ... £4,131

BRIGHTON.—For supplying and fixing iron fence to enclose shubberies on the Madeira-road, for the Brighton Town Council:—
H. Greene and son, Brighton ... £315
Morton and Co., Liverpool ... 300
Reed and Son (accepted) ... 265

BRIGHTON.—For the construction of sewers in Prestonville, for the Brighton Town Council:—
Marshall, J. G. B. (accepted) ... £685

BRIGHTON.—For an additional story to the Sussex Hotel, Cliftonville. Mr. Fred. W. Hyde, architect, Brighton; quantities supplied:—
Cheeseman and Co ... £1,489
Lockyer ... 1,447
Garrett ... 1,380
Botting ... 1,300
Parsons and son ... 1,275
Patching and Son ... 1,186

BRISTOL.—For alterations and additions to Nos. 1, 2 and 3, Bridge-street, for Messrs. Levy and Co. Messrs. J. W. Trew and Sons, architects, 1, Wine-street, Bristol:—
Eastbrook and Sons ... £257 nett.
Giny ... 255 nett.
J. Sanders ... 248 nett.
Neale ... 245
J. Williams ... 237 nett.
J. Broad ... 205 nett.
E. J. Hatherly ... 204 nett.

[*Less £2 for revolving shutters.]

CHISWICK.—For alterations and addition to Little Sutton, Chiswick. Wm. Emerson, architect:—
Howard Bros. ... £5,404
Lasselles ... 5,331
Colls ... 5,251
Adamson and Son (accepted) ... 4,121

CROYDON.—For new offices in Catherine-street, Croydon, for the Gas Light and Coke Company. Messrs. Berney and Monday, architects:—
Coles ... £3,080
Hyde ... 2,967
Hart ... 2,790
Nightingale ... 2,760
Macey and Son ... 2,689
Smith, Jas. ... 2,525

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LONDON.—For the erection and completion of a warehouse in Queenhithe, Upper Thames-street. Mr. H. H. Bridgman, architect; quantities by Mr. Walter Barnett and Mr. F. Thomson:—
Wall Bros. ... £2,057
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Adamson ... 1,896
Brass ... 1,895
Ashby ... 1,883
Manly ... 1,790
Kirk and Randall ... 1,783
Tarrant ... 1,749
Scrivener and Co. ... 1,743
Downs ... 1,733
Grover ... 1,686
Perry and Co. ... 1,680
Conder ... 1,598
Crabb ... 1,584
Hunt ... 1,582
Toms ... 1,473

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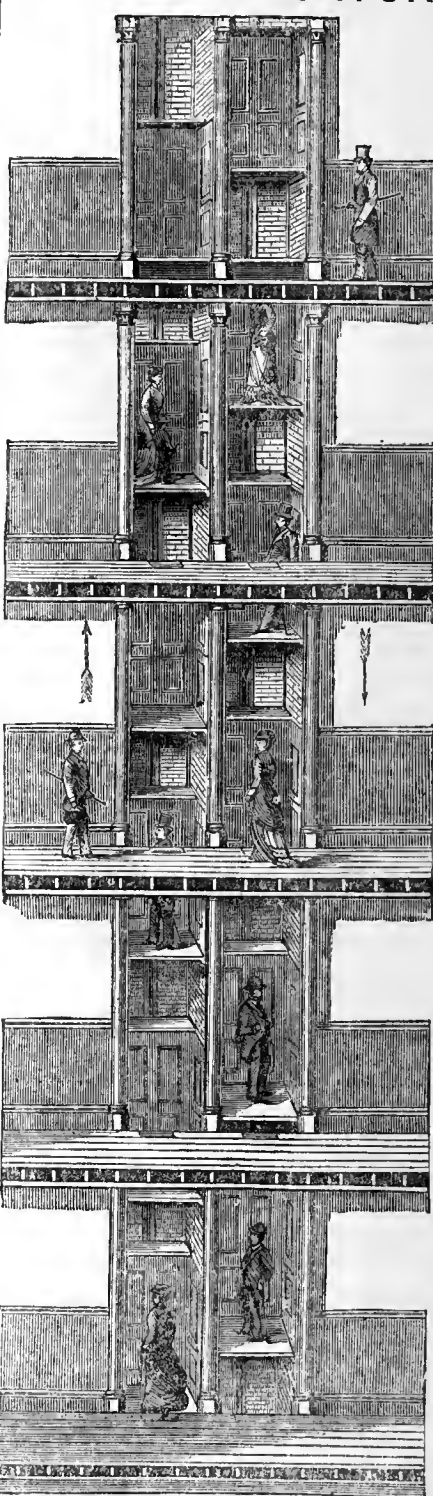
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ROYAL POLYTECHNIC.
R. RALEIGH'S QUEER DREAM (written by TITKINS, Trench, Esq.), given by Mr. OSCAR HARTWELL, assisted by The ZOOPHILIC TROUPE, a funny and clever illusion.—
ELECTRIC LIGHT, by Mr. L. L. KINO.—REMINISCENCES OF THE LITTLE FOLK.—AFGHANISTAN, by Mr. T. C. HERWORTH.—
CHEMISTRY FOR CHRISTMAS, by Mr. J. L. KINO.—NOTES ON NOBLES and those who wear them, by Mr. J. W. B. Blandford Sketcher.—THE INEXHAUSTIBLE TUB.—Manufactures of Confectionery by Machinery, Fancy Soaps, Card and Circular Printing. Lithography, Glass Working, Carving, Engraving, &c., &c.—Admission 1s. Open from 12 till 5, and from 7 till 10.

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THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 14, 1879.

OCCULT PRINCIPLES IN DESIGN.

THE Institute last Monday was occupied in discussing two subjects, each of which had more interest for the archaeologist and theorist than the practical architect. The topics, though widely different, had yet some sort of a relation. In one case the question of planning and one or two abstruse points turned on an old mediæval church, whose foundations, long since buried and forgotten, have recently become a theme of interest; and in the other case, with regard to buildings whose ruins, upwards of two thousand years old, still stand on the rock at Athens, and attest for all time a wonderful era of civilisation and refinement. Now, regarded from a practical standpoint, no one cares an iota as to the precise position or divergence of the axial lines of the old and new cathedrals of St. Paul's, or whether the choir was deflected for symbolic reasons or not; neither, on the other hand, does the practical architect care whether the proportions of the Parthenon were adjusted to the eye from certain points of sight on the Acropolis, as assumed by Mr. Pennethorne. Notwithstanding this indifference, the subjects possess some interest, and we are surprised a larger audience of the younger members of the profession was not present. They were not, perhaps, inviting topics, nor was the manner in which Mr. Pennethorne's theory was illustrated the most intelligible to those who had never before grappled with the problem.

With regard to the question of the decoration of St. Paul's, we have already said sufficient about the objections which forbid a piecemeal scheme, particularly the project for the mosaic embellishment of one part, and that the crowning feature of the cathedral. Our opinion was supported at the meeting by more than one speaker who questioned the propriety of coloured decoration in the dome and the effect it would have in "bringing down" apparently the dome over the still undecorated interior. The partial decoration contemplated, must in the mind of most artists we believe, have the effect we have before feared of destroying the natural scale of the whole building, and throwing it out of harmony; apart from the other question of expediency of beginning with the purely decorative work when so much else needs consideration. With respect to the question of the plan of Old St. Paul's, Mr. Penrose's paper, a report of which we have given, opens up a somewhat occult question, though it also shows how inaccurately the old plans were drawn that out of four extant documents not one agrees with the scale which the recently-discovered cloisters have permitted to be made, and no two agree with each other. In each of them the proportion between nave and choir varies, though Mr. Penrose strongly points to the trustworthiness of the Oxford No. 1 plan, which shows both cathedrals, and which accords fairly with Hollar's. Then there is the more interesting point as to the different directions of the axes of the old cathedral and the new, and the deflection of the choir and transept of the former from the true lines. These points can only be cleared up by an investigation of the actual foundations so far as they can be discovered, and the conclusion we can draw from them must remain more or less conjectural and uncertain. Doubtless, however, symbolic reasons lie at the bottom of the divergences of the axes.

When we come to Mr. Pennethorne's theory respecting the apparent proportions or the visual heights of the Greek temples we have something far more definite and satisfactory, for we know that the Greek architects were masters of æsthetics, and that geometric or optical principles, instead of symbolic ones, controlled the design. The subject was less intelligibly illustrated than it might have been, though some large diagrams, and a few excellent water-colour drawings of the temples by Mr. Phené Spiers were hung on the walls. We may simply explain that Mr. Pennethorne's theory is essentially founded upon optical principles. It is well understood that the geometrical elevation of a building is seldom seen in the actual proportions except from a distant point of view; the actual heights of the various parts, as seen by the eye of a spectator from a certain point of view, subtend smaller visual angles as they rise above the level of the spectator. This the Greek architects foresaw and, according to Mr. Pennethorne, they made certain corrections and adjustments of the real heights of columns, entablature, &c., as laid down by canons in the executed building. They, in fact, worked to a scale of apparent proportions after having fixed upon certain commensurable geometric quantities. Mr. Pennethorne, in his elaborate work on the "Geometry and Optics of Ancient Architecture," speaking of the Egyptian and Greeks, says:—"To prevent any apparent disturbance, either in the proportions or lines, it was found necessary to introduce certain corrections in the vertical as well as in the horizontal lines of the first masses." It does not require any great discernment to understand this requirement. It was necessary first to determine the most general point of sight from which the temple was seen, and the most favourable visual angles were chosen. Let us illustrate a case. In designing such a temple as the Parthenon there was a canon of proportion agreed upon for the width and general heights founded upon certain aliquot parts of the length of the upper step of portico. In the Doric porticoes, we are told, the whole height is found to divide into 9 aliquot parts—namely, height of steps=1 part, column=6 parts, and entablature=2 parts. Having thus obtained the actual heights of elevation, the Greeks from these calculated the *apparent* vertical magnitudes, so that they should be all commensurate with one another, and these were calculated by trigonometry, so as to suit a favourable visual angle. It is not necessary here to detail the method, as Mr. Pennethorne's paper will be found reported elsewhere, but from the above explanation we trust our readers will see the *rationale*. To say the least, the theory is highly probable, as evidence is not wanting from the writings of Plato, Aristotle, and Vitruvius, and other authorities to show that a point of view was invariably chosen by the old architects from which they considered the proportions of their buildings. Again it has been shown by Mr. Pennethorne that the calculated quantities so obtained agree very closely with the actual measurements of the temples. Of course, before the calculations can be made it is necessary to define the proportions, next to assume a horizontal plane and a point of sight in it, and the diagonal of temple or building will give the greatest view the eye can take in. The lineal heights are then obtained. To apply the corrections to the building we may assume an arc struck from the eye as a centre at the required point of view, then lines drawn through the points of division of the arc till they cut the vertical plane of building will give the corrected proportionate heights. In the case of the Parthenon the points of sight selected were two, according to this theory—namely, the south-east and north-west angles, and the results of the calculations

of these angles show a perfect agreement, Mr. Pennethorne says, between the measured and the calculated dimensions. The same agreement is affirmed between those made for the Propylæa and the porticoes of the Erechtheum.

Another part of the paper dealt with the curvature of the horizontal lines, and here the author's ideas do not quite accord with Mr. Penrose's investigations. The convexity of the lines are executed practically as arcs of circles. Referring to the Parthenon, the curvature of upper step = 0.37 by calculation, and by Mr. Penrose's measurement 0.366ft. This is a close approximation. He found the ordinates derived from measurements of steps agreed with those obtained by calculation of arc of circle. The upper step and architrave, according to Mr. Pennethorne's diagrams, have the same convexity, namely, .22, while on the flank it is .37. In the temple of Theseus, the calculated convexity of line of the upper step amounts to .065, and this is the degree of curvature adopted for all horizontal lines of portico. In the Theseum the lines are flatter than in the Parthenon (see "Geometry and Optics"). The quantity .22 regulates all horizontal lines of the last temple. We may remark, however, that Mr. Penrose found in the fronts of the Parthenon a curvature on plan, as well as in a vertical plane; thus the architrave of east front is found to bend inwards, but this has been proved by the same able authority to have resulted from accident, and not design. The only objections, indeed, to urge against the curvature of the horizontal lines are to be found upon the plea of disturbance by earthquake or otherwise; but, before such an argument can be used, the disbelievers in these corrections must account for various other refinements, such as the convergence of the axes of the angle columns, and the curvature of other lines not affected by any such causes. The subject is one that will repay study, and we refer our readers to the report of the paper itself for information, and also to Mr. Pennethorne's exhaustive work on the subject. If the theory of angular correction be not conclusively proved, it is at least based upon a very sound hypothesis, and one which the practical architect will do well to regard in the design of his buildings.

ARTISTIC COPYRIGHT.

SO many people have said so much about the law of artistic copyright during the past few days that by ordinary persons the matter has come to be considered involved to a degree which is certainly not the case. Everyone is pretty well agreed as to the badness of the existing law, which robs both artist and patron of the copyright unless one or both of them are careful to secure it. As matters stand, a copyright in a picture or drawing (not executed on commission) can exist only in those rare instances when at the time of the sale either the artist or the purchaser of the work stipulates for it by a stamped agreement. If this step is not taken the copyright lapses, and any person who may steal a photograph or copy of the picture may engrave therefrom, and sell the engravings without any fear of disturbance either from the artist or the purchaser of the picture. Many people are altogether ignorant that this is the case, but it is so nevertheless, as many an art patron has found to his astonishment and indignation. The recent Report of the Royal Commission on Copyright proposed to end the anomaly by vesting the copyright, in the absence of any special agreement, in the purchaser of the picture. This view, naturally enough, has been demurred to by artists, and one result of the dissatisfaction felt was the late meeting at the Grosvenor Gallery, to which we referred last week. The Royal Academy has probably done more good by the publication

of a memorial on the subject presented to the Government, in which the history and present position of the law of copyright is carefully considered, and in which the objections to the recommendations of the Royal Commissioners which must suggest themselves to any reasonable mind are fairly and temperately urged. The *Times*, in a somewhat shallow article, accuses the Royal Academicians of putting forward "pleas for special treatment," the fact being really quite the reverse. The memorial is a protest against the "special treatment" which, for some reason difficult to discern, it is proposed to mete out to painters. While the Royal Commissioners have decided that the right to dramatise a novel should be reserved to its author, that the fullest rights shall be reserved to sculptors, extending not only to portraits, but to copies of ancient or other works, and over photographs and drawings made of their works, and to photographers as the customary proprietors of the negatives; painters alone are to be robbed of their copyright for the benefit of the purchasers of their pictures. These recommendations have been made by a body of gentlemen exceedingly well able to guard the interests of literature and music, but without having one amongst them to represent the claims of Art, and the result is that if the outcome of their labours ever becomes law the injustice which is admitted to exist at present in connection with this matter will be indefinitely intensified.

The arguments set forward in the memorial of the Royal Academicians on behalf of the painters are just and weighty; but we attach little importance to them in comparison with the public interests, which we believe will be jeopardised if the recommendations of the Royal Commissioners are carried out. When an artist's ideas are carried beyond the original, that is to say, for instance, when engravings of a good picture are multiplied, who else but the artist may be safely trusted to watch and aid the process with an interest above mere pecuniary considerations? Will anyone who really hopes for the education of the popular taste be content to leave the matter in the hands of the mere speculator, whose chief care will be to reduce expenses to a minimum and to earn a high profit. There are artists, undoubtedly, with whom such considerations have had but little weight, but little good or harm is likely to result from the misrepresentation of their works. In the case of one who is an artist in reality—who has spent his best efforts in the achievement of a result which he knows is honestly worth far more than the price paid for its original embodiment in the hope that by-and-by its reproduction may bring him fairly-earned fame and profit, it seems hard that his conscientiousness must be punished in the way it certainly will be if the copyright laws are amended after the fashion at present proposed.

There is another right claimed by the Academy Memorial on behalf of artists which is most important and just—viz., that in the event of the sale of the copyright by the painter, the transaction should not prejudicially affect his ownership of the sketches and studies connected with the picture in question. As the law stands, the right to use these sketches and studies passes from the artist with the copyright of the finished picture; if, therefore, as is proposed, the copyright became, as a matter of course, the property of the purchaser of the picture, the artist would during the remainder of his life use in fear and trembling much of the accumulated work of previous years in the shape of sketches and studies. The Royal Commissioners have indeed perceived this, and have themselves suggested a special enactment for the protection of the painter; the wonder is that their sense of its necessity has not indicated the unnatural character of

their main recommendations, which are, as they admit, opposed to the unanimous opinion of the whole body of artists throughout the country.

We trust the Memorial of the Academy may be supported by outsiders generally, especially by the architectural profession. Architects are too well used, it is true, to the abstraction by others of ideas which no copyright Act can ever protect, and the distortion of which we are compelled to witness with weeping and gnashing of teeth; but that does not in any way affect the justice of the claims set forward by our artist brethren. There are, moreover, some special reasons which we need not refer to here, but which will occur to any of us who have to avail ourselves of their co-operation in the adornment of our works, which should induce us to support the conclusions arrived at in the Royal Academy memorial which we append:

1. The copyright in paintings and drawings to belong to the artist, but carrying no right to disturb the purchaser or owner of the picture.
2. The purchaser or owner of a picture or drawing to be protected against replicas that should so colourably imitate such picture or drawing as to reasonably allow its identity to be challenged.
3. The commissioner of a portrait picture to be protected against copies of any size, and in any material. Also to be protected against the publication and sale of engravings, or prints of any kind, or of photographs from the said portrait.
4. In the event of his sale of the copyright in a picture or drawing, the artist to be protected against such sale affecting detrimentally his full rights of property in all studies and sketches connected with the work in question.
5. Sculptures as per Royal Commissioners' report.
6. Engravings as per Royal Commissioners' report, but to be protected in all international conventions.
7. Registration of paintings and drawings not to be required until the legally-defined owner (the artist) parts with his copyright.
8. Registration of sculpture to be the same as in the case of paintings and drawings.

ON THE NORWEGIAN ORIGIN OF SCOTTISH BROCHS.

THE above title is the heading of a small pamphlet—a reprint from the "Proceedings" of the Society of Antiquaries of Scotland, by Mr. James Fergusson, in which the author endeavours to prove, in opposition to the opinion expressed in a paper read before the Scotch Society by Mr. Anderson, that the Brochs found in the north-western parts of Scotland were built by the Norwegians.

In 1876, Mr. Fergusson wrote a short essay "On the Brochs in the North of Scotland," which has since been published; and Mr. Anderson, the Curator of the above society, has lately written a rejoinder thereto in the "Archæologia Scotica," in which he contends that these towers were "all erected by the Picts not earlier than the fifth, nor later than the ninth century. Mr. Fergusson, in the pamphlet before us, answers Mr. Anderson's reply at some length; and his arguments are generally sound. He says, very truly, "The great tendency of controversies of this class is to get smothered in detail, and to such an extent as to obscure the main facts at issue." Mr. Fergusson confines attention to the essential peculiarities of the Brochs, and to the internal evidence they afford. He remarks "the one great fact which it is indispensable should be borne in mind in order to appreciate what follows, is that the Brochs are essentially works of fortification, and can only be understood when treated of according to the known principles of military science. Fortunately, whether applied to castles, citadels, or towns, these are few and simple and nearly identical in all ages and countries." From the earliest times, observes the author, through all the middle ages, and down to the curiously complex system of the present day, "none of man's architectural works have been subject to such rigid and unchangeable laws of utilitarian use as works

of fortification. Use, and use only, governs every form and every detail. . . . If, consequently, the Brochs are works of fortifications—which no one doubts—their age and uses ought to be easily ascertainable by the application of the same rules which govern all other works of their class, and it is, I believe, because they have not hitherto been looked on from this point of view, that any uncertainty exists regarding them." Mr. Fergusson further observes that no extraneous evidence has been found pointing to any date or origin. In reply to the argument that the Brochs cannot be Norwegian, because there are no Brochs in Norway, the author, with justice says, the same argument may apply to all other countries. "It may be argued they are not Celtic because there are none in Celtland except four; there are none in Pictland, though that was inhabited by Celts much more nearly approaching in condition and position to the inhabitants of Brochland than the Norwegians."

From such arguments Mr. Fergusson shows that these erections are due to some circumstances peculiar to the north-western part of Scotland. As regards their being built of stone, it was not likely in this part of Scotland, treeless as it is, they would have been built of wood, when rocks of sandstone or schistose slate existed close at hand. The peculiarity of this form of architecture is attributed by Mr. Fergusson to the presence of the Northmen or Norwegians in these countries. Either, it is maintained, the Brochs were built by the Celts to defend themselves and their country against attacks of the Norwegians, or they were erected by the Northern people to defend themselves against the Celts. As regards the precise date of the Brochs, the author does not inform us, though their distribution is given by Mr. Anderson as follows:—Shetland 75, Orkneys 70, Caithness 79, Sutherland 60, Ross Mainland 10, Isle of Lewis 28, Inverness 6, ditto Islands 41, Forfarshire 2, Perthshire 1, Stirlingshire 1, Berwickshire 1; total 374. Mr. Fergusson says the line of the Caledonian Canal divides Scotland into two parts, and we have 400 or 500 brochs on its north side, and four at the utmost on its south side. Eden Hall, Berwickshire, is not considered a true broch, and the other four in Pictland are explained by the author; at least, the four or five are considered exceptional. Mr. Fergusson thinks, from the above unequal distribution of these towers, that they were built by the Northmen themselves, for it is difficult to see what difference existed between the Celts on the two sides of this division. Hence the conclusion that "Norwegian Scotland is identical with the land of the Brochs, and that either they or the Celtic inhabitants of that region whom they dispossessed built them." While admitting the capabilities of the Celtic race, Mr. Fergusson thinks that during the Broch period (500 to 1000 A.D.), the Celts were in a very low stage; they were always gregarious, and he implies they never could have in this Highland district have risen to the high degree of civilisation the builders of the Brochs must have reached.

Discussing the theories of erection, the author describes minutely a typical Broch on the island of Mousa. It is a tower 50 feet diameter at its base, and now in parts over 40 feet high. At its inner floor line its court is 20 feet diameter, its walls 15 feet thick, honeycombed with galleries and bee-hive apartments. There are 3 of the latter on the ground-floor, and 6 of the former, one above the other, a staircase in the thickness of walls giving access to each, and also to a bartizan on the top of walls. (See Sir Henry Dryden's detail drawings in the "Arch. Scot." Vol. V.) It shows a high degree of constructive skill and is capable of holding a large garrison with stores. It is contended that a tower of this kind could not have been built by a

fisherman population, or by those engaged in agricultural or pastoral pursuits; the island must have been populous and wealthy to have required such a fortress, while the position of the tower, within 80 feet of the shore, and with its entrance turned towards the sea, makes it very improbable that the Celts could have erected it. On the other hand, if we suppose the Broch on Mousa to have been built by the Norwegians or Vikings, as suggested, the tower and its position are intelligible. The Shetland and Orkney islands were a convenient stepping stone to base further operations against the British islands, and this little island was most suitable for a settlement. No fortress, the author says, was more ingeniously contrived for defence to resist inland and foreign invaders, and the exigencies of the Vikings' life were met in the construction of these towers so exceptional in their design. It is not necessary here to enter into further details, though historical facts are equally strong against the Celtic theory. These Brochs, moreover, are situated at a distance from each other, so that they could not afford mutual support. Some of these towers were afterwards converted into farmhouses by secondary occupation, and the materials of others were used in buildings. Mr. Ferguson gives some illustration of a class of sepulchre in Scandinavia, bearing on the subject of Brochs; one is a plan and view of a dolmen at Uby, built of large boulders. In conclusion, the Irish Round Tower appears to have been a modified Scottish Broch, erected to meet other requirements. The Cloitcheachs or Round Towers were erected for defence, but afterwards may have been turned into belfries; and Mr. Ferguson thinks that an investigation into the age and uses of the Brochs will furnish the only key for the solution of the mystery still hanging round the origin and use of the Round Towers of Ireland.

THE ROYAL SCOTTISH ACADEMY.

THE fifty-third Exhibition of the R. S. Academy has been opened a fortnight earlier this year, and without the usual flourish of trumpets in the form of after-dinner speeches. The banqueting scene was dispensed with in consequence of the great loss sustained in the death of two such eminent members as Paul Chambers and Sam Bough, who were both unexpectedly removed from the field where they had won so much renown for the Academy and Scottish art.

The exhibition is considered as being a good collection, comprising some works of the very highest order, and great numbers of more than average interest and excellence. Mr. Lesly's well-known picture of "School Revisited" has evidently the widest circle of admirers. Alma Tadema has sent a work entitled "After the Audience," in which is represented an incident in the daily life of the great Roman Agrippa. This gentleman is interesting to the architect in having done something to help his great patron to turn the bricks of Rome to marble, and the painter has succeeded wonderfully in delineating one of the marble halls of the Imperial City. The texture of the surfaces and aerial perspective of the scene are rendered with a photographic accuracy of detail in the light and shade, which is really marvellous. Agrippa, who is made more of a veteran than his not very lengthened career would lead us to expect, is ascending a broad flight of steps, while a crowd of suitors watches with eager glances his retreating form. In the distance is an inner court, in which a crowd is gathered, among whom the lectors are conspicuous; and a great charm of the picture is the contrast between the shady light on the foreground of marble and the brilliant illumination of the distance, beyond which again there is a glimpse of blue through an open doorway. The picture is full of interesting study in many other aspects. The late Paul Chalmers and Sam Bough are well represented. Sir Noel Paton sends only a small study for his larger picture of "The Adversary." It is a very realistic conception of his subject, with

a serpent wriggling in burning lava at his feet. Whether he is about to "take a thought and mend" or not is left doubtful; but it is quite safe to say that Sir Noel has not made his "Satan" a hero. Mr. Herdman has a large painting of an imaginary incident in the adventures of the fugitive Prince Charlie. It is a scene of cottage life, when the gudewife pays homage to her unexpected guest, whose "duddies" bear token of his having come through many thorns and briars on his way. Mr. Gibb's picture of the "Retreat from Moscow" gives a good representation, without overmuch of sensational horrors, of the dark, dreary winter of that dismal march.

The water-colours and sculpture are not remarkable in containing much of any great interest this year. As far as commercial prospects are concerned, it is satisfactory to be able to state that the receipts of the opening day for 1879 considerably exceeded those for 1878, and amounted to over £2,000.

The Royal Scottish Academy has certainly accomplished well its mission in encouraging the study and practice of the art of painting. The great amount of mediocre excellence appearing on its walls is itself a great result, creating a want and providing the supply. Signal as has been the success of the Academy in respect of painting, as indicated by the crowd of applicants for space and the number disappointed, small praise is due to it for its encouragement of architecture, as a sister art, entrusted to its fostering care. It has not given a fair field or any favour to the production of original design, or any encouragement to induce exhibition of works which would make the annual exposition really representative of what is interesting and important in the architecture of Scotland. Architecture is treated as an interloper, hardly fit to bear other pictures company, having no local habitat of its own. Many of the drawings are lost in the crowd of water-colours, and others placed with supreme and ignorant indifference to the character of the design or the scale of its artistic draughtsmanship. An etching, or geometric elevation, with much fine detail in the drawing, such as 937, Mr. Aspen's "Yarmouth Town Hall," or 959, Mr. Sheill's "Church Front at Dalkeith," is sent beyond reach of human optics to command the character of the detail, and small scale drawings have been perched aloft to complete the pyramidal outline of the group below. Another subject, drawn to a scale preposterously large for its importance, is placed close to the spectator. In short, the arrangement of architectural drawings, as distinct from the water-colours, seems to indicate that they are, with few exceptions, considered as the pieces of a Chinese puzzle, to be fitted as best they can into any space left for their reception after the water-colours have been served. In the face of treatment such as this, it is not encouraging to prepare important works for exhibition. Even ordinary subjects, which necessarily bulk largely in the Exhibition, would probably appear in fewer numbers, were it not that building committees and proprietors are supposed to desire a sight of their edifices on the walls of the Academy.

The architectural section this year is a good one. There is less of faulty delineation and commonplace design, a result, no doubt, owing to the fact that the number of subjects is very much less than in former years. The circumstance has also occasioned a better arrangement of the architecture which occupies one compartment to itself—the side selected for it being, of course, the worst.

The most important work delineated is the Royal Infirmary. It is a bird's-eye view of this great national undertaking, coloured in monochrome, and presents a very clear view of the vast extent and order of arrangement of the several departments. The drawing is not executed, of course, to a very large scale, and its ridiculous position next the ceiling, requiring the spectator to look up at it when he should be looking down, is very aggravating to the eye. 974, "Interior of Library of Royal College of Surgeons," should have been hung where the Infirmary is placed. It is unfortunate in colouring, and lacks precision of outline, so necessary to perspective, of its various distances between the book-cases. 973, "The New Hospital for Incurables," is Classic, of simple, dignified proportions. Exception may be taken to the small pediment which ornaments the centre, and which looks poor for lack of company. Mansion

houses and street architecture are few and feebly represented. 970, "South-east View of Kenwith, Perthshire," is a weak etching, and it is to be hoped that the north-west view is more inviting, with less of the donjon-keep about it. 957 is a piece of street architecture in Paisley, comprising the offices of no fewer than three branch banks. The design shows nothing of the ornamental other than what is provided by a judicious arrangement of the features peculiar to the Scottish Baronial style in its plainer character.

The strong point of this Exhibition is church architecture, of which there are eight or nine separate subjects, with the novelty of several drawings illustrative of some of the designs. Mr. R. Anderson, who is a member of the Academy, sets a good example in giving exterior and interior views, fully illustrative of his designs. These drawings are executed to a reasonable scale, and may be considered models of architectural delineation, as pen-and-ink sketches. 940, "Episcopal Church at Forfar," has the ordinary nave, aisles, and small tower and spire. The chancel is large, and well-lighted, but the triplet at the east is disfigured by two very awkwardly-placed trefoil piercings. The pillars of the nave have only imposts, and the whole design appears to be of an economical description. 965, "The New Free Church at Kirkecaldy," by the same architect, is interesting as an attempt to dress out the old-fashioned Presbyterian meeting-house, with its circumambient galleries, in Early English Gothic. There are, however, novelties in the construction. The plan is evidently of great width in proportion to the length, and the front shows a large, circular sweep, with the tower and spire at its side. The roof is partly carried on iron pillars, boarded over at the tie-beam. A wooden clerestory, lighted with borrowed lights from skylights in the lower portion of the slating, with the bracketed supports, has a good effect. But the result is not by any means a very successful attempt at solving the problem, which seems to be insoluble. The proportions of the plan are at perpetual war with the structural conditions to which Early Pointed Gothic owes its origin. The spire, which is very plain, but well-proportioned, looks lanky beside the breadth and rotundity of the church, and enhances the incongruity between the proportions of the edifice and its Gothic detail.

964, "House at Colinton," by Mr. Anderson, is a very faithful reproduction, externally, of the domestic architecture of the fourteenth century, but will hardly satisfy the conditions of the "picturesque" or "pretty," popular in the nineteenth.

Another church, exhibiting some novelty in its design, is 953, "A New Parish Church at Galashiels." This is also an attempt in another direction, to solve the difficulty of reconciling Gothic proportions and detail with the comfortable accommodation of a large congregation. Galleries in this case are dispensed with, and ground-floor space is attained by adding to the nave, by aisle and transept projections. The peculiarity of the design consists in the equal apportionment of aisle and transept as additions to the nave. The tower is placed next the transept. The drawing of this and some others is executed to a scale disagreeably large for artistic effect, and is very indifferently done, and inaccurate in its perspective of detail. There is no view of the front or the interior, and the aspect represented depends for its effect on the three gables of the transept, with the three large Geometric windows, somewhat mystically balanced by the three smaller lights of the aisle and three corresponding lights of the clerestory above. The tower and spire, like most of the towers and spires exhibited, is a curiosity. It presents the striking novelty of a smaller tower peeping above the battlements of the one below; each with its cornices and crocketed finials, of which the one at the west corner seems very insecure. The same characteristic as to the exaggerated scale applies to 960, "A New Church at Portobello"; and another feature conspicuous in both is the amount of louvre-boarding and the double bell chambers, one over the other, leading to the inference that an unusual number of bells have had to be provided for.

938, "A U. P. Church in Dundee" is a water-colour sketch of a design in the Norman or Romanesque, and comprises nave and transepts, with the inevitable tower and spire at the corner. The detail of the large west window is not very

happy, with its transept and supports and semi-circular wheel above. The tower shows a preposterous amount of monster louvres, which very much impairs its appearance of stability.

945 is a drawing, or rather three rough sketches, in monochrome of "Anderson Free Church," Glasgow; two exteriors and one interior. The site appears to be the brink of a very steep declivity, and, as a whole, the composition is picturesque. The design is ordinary Early English; and galleries appear to run round the interior, which shows an aisle beyond the nave. The effect of the gallery cutting through the piers is not happy. One peculiarity of the design which strikes the eye is the shortening of the lights over the pulpit, in order to provide a large wall space for some pictorial illustration, which is dimly indicated in the sketch, and for which, it is to be feared, a faculty will be difficult to get from the General Assembly.

952. "A Competition Design" is a pretty water-colour sketch of a church and its adjoining hall. The detail shows a very elementary acquaintance with Gothic detail; but the proportions appear to be good and the several parts are pleasantly grouped.

967 is a design for organ case and pulpit in Decorated Gothic. Both are very ornamental. The latter is a rostrum, rather long for its distance from the wall, with triple canopy overhead. The supports of the canopy are too slender, and the two brick pillars carrying the slightly projecting part of the front are Norman in their proportions.

There are many excellent water-colours representing architecture and the picturesque in bits of Melrose, Roslin, and St. Monance Churches. Mr. Arthur's picture of "Lucy Ashton's Chapel" is very accurately drawn, and the landscape and light of the picture are finely rendered. E. George's works are always welcome, and in 903, "The Cathedral and Castle of Linburg," he has produced a picture which exhibits a rare combination of the picturesque in nature and art, and illustrates forcibly the character of the age which made the lords of the manor select such rocks for a foundation. Mr. Lessels sends a large and expressive water-colour view of the interior of St. Jacques, Antwerp; but the arches of the nave, by some mishap, are not in the same plane as the clerestory above.

NEW R. C. CHURCH IN CADOGAN-STREET.

A FEW weeks ago we referred to a new church in the neighbourhood of Cadogan-square from the designs of Mr. J. F. Bentley, upon which we commented in favourable terms. Last Saturday the Architectural Association visited the edifice, and we take the opportunity of giving our readers a general description of the interior. It is not exaggeration to say that this church, though unpretending in its external architecture, is a building displaying a more than ordinary degree of merit, and marks a development of Gothic that has unfortunately found but few able exponents. Mr. Bentley, like Mr. Pearson, is a thorough master of the true spirit of Gothic detail, and it is this peculiarity which above all else claims our admiration when we enter the church in Cadogan-street. One of the greatest weaknesses of our church architects has been the multiplication of detail and a tendency to efforescence. In Mr. Bentley's church we are impressed by a sense of supreme simplicity and breadth. There is nothing fussy and fidgety about the arading, the clerestory, or the roof. Most modern churches are spotted or striated in coloured material; in this building there is nothing of the sort. There is no attempt at brick relief, all is of a quiet warm stone tint, with plenty of wall surface for frescoes as means permit. Corham Down stone has been chiefly used in the interior, and the chancel is completely faced with ashlar of this material, while externally white-stocks with stone dressings have been used. The roof is devoid of all cumbersome and elaborate framing; a plain wooden barrel vault of crown tint, slightly pointed, relieved by moulded ribs (or principals) and rafters painted of a bluish green, covers the nave, while the chancel roof is varied by being composed of a series of eaves, the springing ones being stilted. At each principal is a simple tie-beam suspended in the centre by an iron king; the principal ribs are framed above and below the tie-beam, which

latter intersects the ribs above the springing. In the aisle roofs we observe a series of three eaves similarly treated, the lower one being deepest. The plan of church comprises a nave of four bays, 82ft. long and 27ft. wide; a chancel, 35ft. in length by 24ft. in width; aisles 15ft. wide each, and transepts bounded by the outer walls. At the east end of north aisle there is a Lady chapel, on the south of chancel a chantry, with an organ chamber, and a sacristy projecting beyond. The height to ridge of nave inside is 55ft., that of chancel being 52ft. The proportions are effective, and we are informed the acoustical qualities are good. At the north-west corner is a spacious porch, which forms the westernmost bay of aisle, and we notice its eastern wall is pierced by a four-light window, through which a pleasing vista is obtained of the aisle, and the east Geometric window of Lady chapel. Opposite the porch, forming a gabled projection, is the baptistery, while above the former is a tribune approached by a spiral stair, which is externalised as a low roofed turret flanking the west gable. One pleasing variation upon the usual plan is the internal buttressing in the north aisle. The site was cramped, and as this side of the church is bounded by Cadogan-street, the architect has wisely utilised the space that would otherwise have been taken up by outer buttresses, making the wall flush externally. By this means, a series of recessed bays are produced in the aisle, arched over by drop arches, and one of them is converted into three confessionals with arched heads, the treatment of which is very effective. Another feature adding much to the east end is the screened triforium formed on the inside of the east window above the altar, access to which is obtained by a small turret at the north-east angle eastern gable. The passage or gallery is formed within the thickness of the wall, the inner face being relieved by a beautiful open screen, forming four cusped lights under three arches with traceried heads. Below the open screen and above reredos runs an arading of cusped panels, which also continues round the sanctuary sides. Below this the altar end will have a carved stone traceried reredos of curvilinear style though without colour, and the sides of reredos and return walls of sacristy are enriched by a series of gabled panels, the heads of which are crocketed and their intersections carved with angels by Mr. McCarthy, to whose work we must award high praise for the true Gothic feeling he has imparted to it. The band of carved leafage over the reredos and the heads at the termination of labels in sanctuary are particularly fine in expression, while the foliage of caps and pendant shafts supporting ribs of roof are close, and devoid of that bunched and coarse effect we generally notice in churches. The nave is effective in its simple division. The clerestory is lofty, and pierced with cusped lancets under drop arches, two to each bay, while that of the chancel forms a series of lancet lights. The arches of nave are moulded with exceedingly effective members, the chief of which is a bold ogee, finishing at the lower angles with a roll member, slightly pointed. The pillars are on plan elongated octagons, a slightly pointed shaft running up the narrow side of each on the nave side carrying the main principals. In the chancel they are varied, and have a rather peculiar section with deep hollows. The interior dignity of the church is enhanced by the four lofty lancets of equal height internally, which pierce the west gable end. This window has drop arches resting on small detached shafts, 21 feet high, of Hopton Wood stone, tied at intervals into the jambs by iron bars. The centre pillar at the east window screen is also of Hopton Wood stone. Another pleasing detail is the treatment of the entrances at the west end, the thickness of wall being here reduced internally by three drop arches. We note a great variety and much refinement in the detail. The organ chamber, for instance, has an open Late Curvilinear or Flamboyant screen in front of the organ; the Lady Chapel, east end, has a Geometric window; the reredos tracery is certainly Late, while the remaining portions are evidently Early in character. The cap mouldings are fine and close set, and, on the whole, the masonry is highly creditable. Mr. Howell has acted as foreman of masons, under the contractors, Messrs. Braid and Sons. The flooring will be of boards under the seats, and tiles in the passages, chancel, and chapels. The windows are filled with plain cathedral glass set in lead square panes. Externally, the simple lofty lancets at the east and west ends are enclosed

under arches, and have small stone ashlar buttresses on the broader faces or mullions. The masses of main gables, transepts, and aisles, together with the angle turrets (the western one being only temporarily roofed with a low tile roof) group very agreeably, and the colours of bricks and tile harmonise together. The execution of the works reflect much credit on the contractors, Messrs. Braid, and upon the able clerk of works, Mr. Thomas Spooner, who has acted under the architect. The carving has been entirely entrusted to Mr. McCarthy.

ROYAL ACADEMY LECTURES ON ARCHITECTURE.

ITALIAN GOTHIC THE PRECURSOR OF THE RENAISSANCE.

IN commencing his second lecture Professor E. M. Barry said he should devote this course to a consideration of the Renaissance in Italy, and as a prelude to so doing, should speak that evening of Italian Gothic as the precursor of the Renaissance. That change of style must be roughly divided into three periods, the Transitional, the Roman, and the Pedantic schools. At the first signs of the Renaissance in Italy, Gothic was beginning to exhibit symptoms of decadence, both in general forms and in detail. Vigour of thought was replaced by refinement of execution, and architectural ornament had become uninteresting. The Italians had always worked on somewhat different principles from the architects of sterner climes. Living upon classical soil, and among the dry bones of old Classic art, they were in the most favourable position for welcoming a change which to them seemed but a natural return to ancient traditions. Among the peculiarities of the Italian Gothic was a spirit of horizontalism opposed to the all-pervading verticality of our own Mediaeval architecture. In the larger diameter of shafts, and their frequent use as single supports, reminiscences of the columns of Greece or Rome suggest themselves. The pointed arch, moreover, seemed unable to hold its own. The Italians loved the round arch, while they only tolerated the pointed form. Ignoring buttresses, they tied their arches together with iron rods, and seemed incapable of those daring feats of construction familiar to Gothic architects elsewhere. Repose and breadth of effect had more charms for the Italian mind than the bold projections, deep shadows, mysterious intricacy, and complicated details of Northern work. They had broken, indeed, with the simple lintel construction of Greece; but the arches of Rome were less easily forgotten, and their employment less readily renounced. The graceful campanile of Giotto, at Florence, illustrates many of these peculiarities, and others are exemplified in the cathedral to which it serves at once as a foil and as an appendage. This great church of Ste. Maria dei Fiori, the Duomo of Florence, stands forth as a giant, disdaining ornament or smallness of detail. Its features are few, simple, and almost colossal in scale. In it we see a remarkable plainness and simplicity of plan. It was commenced by Arnolfo di Lapo, just before his death, which occurred about 1300. He is usually credited with the general conception, arrangement of plan, and construction or design of vaulting, always excepting the dome, added long afterwards by Brunelleschi. With this, the largest Mediaeval church in Italy, may be advantageously contrasted Westminster Abbey. In the nave of the former, 250ft. long, there are but four arches; in the latter example, we find twelve arches in a length of 233ft. Each church is divided transversely into nave and aisles, but these three divisions occupy a space of 125ft. in the Italian, and only 75ft. in the English example. At Florence, we find a grand central space surmounted by a pointed dome, with three tribunes, all alike covered with semi-domes. At Westminster, there is a multiplicity and intricacy of parts, planned with various angles, and much diversity of dimensions and detail. At Florence the scale is too colossal to please, and has the character of a small design unduly magnified. On entering the nave, the great arches, although well and gracefully proportioned, have a bare and unsatisfactory effect, and on passing to the central area, under the dome, this feeling is intensified. The grand dimensions of the dome, 137ft. diameter, and about 286ft. high, are thrown away, by reason of the paucity of detailed parts of moderate

size, to serve as a scale for the whole. Arnolfo's nave is groined in a simple manner, and, like many other parts of an Italian Gothic building, the vaulting seems incomplete without painting. The designers of these structures regarded them rather as a framework, to be filled in by others, than as works of architecture, complete in themselves. Simple forms, spaciousness, and great wall-spaces are consequently found associated with Gothic architecture in Italy. The Northern architects had a less wealth of art, but more skill and self-reliance; they were engineers as well as artists, and, employing buttresses in the most scientific constructional forms, they were ever advancing in their art. The Italians shunned buttresses. Strength was usually obtained, less scientifically, by an enormous thickness of wall, and resort was had to iron ties to keep the arches from thrusting out the walls. With their love for repose and breadth of effect, they preferred a plain wall, as at Florence, to the varied surface, as at Westminster, with its variety of light and shade, and its picturesque outline, both of plan and elevation. They did not, indeed, wish their walls to be undecorated. They were ready to cover them with marbles, arranged in panels, and to crown them with cornices of great elaboration. Such marble veneering is essentially weak ornamentation; it indicates no construction, and might have been applied by any one, and at any time. It serves to give some scale to the building; but it is an independent attempt at decoration, and not an architectural design successfully achieved. Italian Gothic must, indeed, be regarded as an incomplete style, not fully worked out. Whether we regard the general principles of composition, or the detailed forms adopted in Italy, we come everywhere upon traces of Classicism, which seemed to herald the Renaissance. Amongst the details of this and other Italian churches recalling the Classic forms we find single shafts used not only in arcades, but as mullions for windows, and in these cases often doubled on plan with happy effect; the abacus and lowest member of base are nearly always square, and there is occasionally a diminution in diameter from base to capital. The archivolts are frequently plain with square edges. When the arch was not actually square in section, a few indentations, with the occasional interposition of large beads, filled the place of the smaller beads, fillets, chamfers, and hollows, of English Gothic. The cornices, again, formed strong horizontal lines round a building. In their fondness of plain surfaces, and dislike to bold projections, the Italian architects may be said to have designed their buildings as elevations, while our own medieval architects thought theirs out in perspective. The brilliant climate had something to do with these differences, and another reason was the fondness for applying thin veneers of costly marbles to the whole external and internal surfaces. In spite of all care, it has been impossible to prevent these slabs from cracking, or bulging, as unforeseen pressure comes upon them; and then all sense of permanent security and enjoyment vanishes. The introduction of marble in panels, recesses, or spandrels is not liable to this objection. The panelling on the outside of the cathedral at Florence recalls the work of the cabinet-maker rather than that of the architect. That building is however, incomplete, and if the entrance-front had been finished, as designed by the architect, the whole effect of the exterior would have been more pleasing. We do not, indeed, know how Arnolfo would have treated his façade, but in Siena Cathedral an example exists, very rare in Italy, of a front entirely finished. In this case, we have an elevation of great richness and much beauty of detail. It is, however, an application to the building, a veneer on a large scale, for the outline bears but an imperfect reference to the constructional form of the building within. Gables appear for ornament, without roofs behind them, and the aims of the designer were akin to those of the scenic artist, who presents us with a frontispiece, and does not allow us to turn the corner, or view it save from one point. The interior of Siena Cathedral is one of the most charming of Italian Gothic churches, not so much for its architecture as for the exceeding beauty of detail of the accessories thereto. The strongly-marked banding of various coloured marbles in its walls is, indeed, monotonous, and inharmonious with the vertical principles of Pointed architecture, but

the whole interior glows with gorgeous colour. We have exquisite carvings, elaborately inlaid woodwork, paving of splendid design and execution, bronze and ironwork, gilding and coloured marbles in profusion. The architect has provided an arena, within which art revels. The details are everything, and the general architectural idea is smothered by those who should have been its servants. In further comparing Italian with Northern Gothic, we cannot but notice the difference in the windows, not only as regards their relative frequency and size, but also their architectural character. In the great Northern churches the architects delighted in large and elaborate windows. In Italy they were few and far between. The brightness of the sunny South taught its builders to exclude light and glare, and the use of coloured glass was not encouraged. Stained glass would have been inconsistent with the methods of internal decoration common in Italy, for Italian architects applied to their walls that which their Northern contemporaries placed in their windows. There is very little tracery, and where it exists it seems designed to exclude the light, while the absence of an adequate clerestory causes a heaviness, lack of gradation in height, and want of variety. Of late years, so much attention has been given to Italian Gothic architecture that many of our architects have adopted details from it into their own designs. The lecturer saw no grounds for condemning such a practice, apart from the special circumstances of each case. But to utilise these details well and reasonably is a matter of no small difficulty. The essential quality of all true art is its fitness, and in adopting Southern detail into Northern work, the presumption is against the process. We should, therefore, be very sure that in attempting fusion we are not sacrificing principles, or offending common-sense. With this proviso, the lessons of Italian Gothic are before us, and may, in certain cases, be followed with advantage. One inducement to adopt the architectural details of North Italy has arisen in consequence of our habitual employment of brickwork, both on the grounds of economy and the difficulty of procuring stone. Brick has, of necessity, become the common building material, and a style of architecture which seems to lend itself readily to its use has obvious claims on attention. In the plain jambs, simple mouldings, geometrically enriched cornices, and string courses of North Italy, we have features specially appropriate to brick architecture, while by the use of the column the use of numerous small pieces in the mullions of the windows is avoided, a very apparent defect in the brick Gothic architecture of Northern Europe. The adoption of terra-cotta, again, has proved an argument in favour of Italian types. The use of this material is splendidly exemplified in such Italian buildings as the great Hospital at Milan. In England, apart from a few exceptional instances, terra-cotta has held an inferior place, but it offers great opportunities to the architect of taste and judgement. The limits within which terra-cotta can be properly applied may be broadly defined as ornamental rather than constructional. In using brick in our large towns, we must bear in mind the changes of our climate, and the consequent dinginess which, sooner or later, settles on brickwork, and obliterates distinctions of colour. We are often very hard on our immediate predecessors who covered their brickwork with stucco; but their buildings, at any rate, admit of being cleaned, so as to afford some cheerfulness to our streets. Architects have, perhaps, been too indiscriminate in their denunciations of plaster. For interiors, it has many advantages, and is often to be preferred to the rude brickwork, not too good, either in quality or workmanship, which we are asked to accept in exchange. No one would use cement dressings and cornices if he could do better, but for coating plain walls plaster will act as a protecting covering, giving both warmth and dryness. There should be some place in our work for methods of building which possess these advantages, and the question arises when and now plaster may be legitimately used. The Italian Gothic architects had not much affection for brick surfaces in themselves, being always ready to cover their walls with veneers of marble, an application of a covering more foreign to the structure treated than cement or plaster. It is impossible to lay down absolute rules in such matters. Architecture should satisfy the reason, and should please the taste; and all the arguments in the world will not make a man like

that which his soul abhors. In studying the art of other times and nations, let us not forget the dictates of common sense, or the needs of our own age and country.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

THE BRITISH ARCHÆOLOGICAL SOCIETY.—Some interest was created at the meeting of the British Archæological Society on Wednesday week by the exhibition of a number of small objects in jet and jet-like substances, with bone hair-pins, &c., said to have been found at South Shields on the site of the recently-discovered Roman station known as "The Lawes," and about which much curiosity has been excited among the antiquaries of that town. The majority of these objects, chiefly from the "finds" of other persons who are continually at work on the spot, must be regarded with considerable suspicion as being manufactured on purpose to mislead and entrap the unwary, and the chairman, Mr. H. Syer-Cuming, in perfect accord with most of the members present, denounced them as "impudent forgeries." Mr. Loftus Brock, F.S.A., followed with a description of a recent discovery at Carlisle, on the course of the Roman wall, of a large monumental stone slab, beautifully sculptured, and representing a female figure seated beneath an architectural canopy, holding in her right hand a round fan, like those used by ladies of the present day. A child stands by her side, and on the canopy are the figures of two lions devouring human heads. Mr. Brock alluded to this sepulchral monument as being similar in artistic treatment to the famous Palmyrene tombstone, found last autumn at South Shields, as the photograph of it clearly showed, and closed his remarks upon the interesting memorial by pronouncing it undoubtedly Roman, though without any inscription remaining. A descriptive paper, by Sir Lewis Jarvis, V.P., on "Middleton Towers," now by his skillful architectural management restored to something of its former baronial character, having been built by Lord Scrope, temp. Edward III., then followed; with a short paper by Dr. Harker on "Pre-historic Remains found at Morecambe," read by Mr. De Gray Birch, and one by Mr. Syer-Cuming, on beggars.

CHIPS.

The Rev. F. Storer Clark, vicar of St. Peter's, Greenwich, complains that he is one of several clergy who find their ministry marred through an echoing church. "If any brethren have been able to remedy such a calamity, we shall be thankful to know of the remedy, or of any architect who has made this a special study."

The Ramsgate Town Council decided last week to convert the old fish market into borough surveyor's offices.

The Cork Town Council on Monday elected Mr. M. T. O'Keefe, of that city, as city engineer and surveyor. The salary is £350 per annum, and the surveyor is to give his entire and exclusive time to his official duties.

The Dorking Rural Sanitary Authority have been served with a writ under the Rivers Pollution Prevention Act, on account of the alleged continued pollution of the Pibrook by sewage. In consequence of this, negotiations have been accelerated for the formation of Dorking and Leatherhead, which latter is at present in Epsom rural district, into a combined district for sewerage purposes.

A permanent contagious diseases hospital is about to be built at Tunbridge, from the designs of Mr. Noot.

An inquiry was held at South Petherton last week, before Major Tulloch, in reference to an application from the Yeovil Rural Sanitary Authority for sanction to contract a loan for the drainage of South Petherton. The sewage will be utilised on farm land.

The Wolverhampton School Board are about to enlarge the infant-schools in Redcross-street, at a cost of £630. Mr. Fleming is the architect.

An inquiry was recently held at Petworth, before Mr. Arnold Taylor, an inspector of the Local Government Board, with reference to an application from the Rural Sanitary Authority of Petworth for approval of a special drainage district comprising a portion of the town of Petworth, and for sanction to borrow £2,500 for works of sewerage for the said district. No opposition was shown towards the scheme.

A stone spire is being added to St. Peter's Church, Bournemouth. The work will cost £3,000, and will be completed by Michaelmas.

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ILLUSTRATIONS.

THE NEW NATURAL HISTORY MUSEUM—NATIONAL PROVINCIAL BANK AT SUNDERLAND—"BUILDING NEWS CLUB" DESIGN FOR A WAYSIDE INN—THE LOGIC OF ARCHITECTURE—HOUSE OF THE SEVENTEENTH CENTURY AT DERBY.

OUR LITHOGRAPHIC ILLUSTRATIONS

NEW NATURAL HISTORY MUSEUM, SOUTH KENSINGTON.

At last we are enabled to publish the promised general view and principal plan of this important building, of which we have already given a large series of working drawings showing the terracotta construction and ornamentation (see *Building News*, Oct. 11 and 25; Nov. 8, 22, and 29; and Dec. 13 and 20, 1878). The plan which we give shows the building as executed, and it will be noted that the large hall formerly called the "Index Museum" is to be known as the "Typical Museum." Our perspective view is the same as was exhibited at the Paris Exhibition last year. The building will very shortly be completed, though probably will not be occupied during the present year. Mr. Alfred Waterhouse, A.R.A., is the architect.

NATIONAL PROVINCIAL BANK OF ENGLAND, SUNDERLAND.

Our view of this building, which is one of the important branches of the above banking corporation, is taken from a drawing exhibited in the Paris Exhibition of last year. The fronts are of Portland stone, and the site being a corner one in the High-street, leading from the Docks to the railway-station, the position is commanding. The entrance at the angle is through a handsomely panelled mahogany lobby, into the banking-room, which is a lofty room 40ft. square. The walls and ceilings are divided into bays, panelled and moulded; the counter and desk fittings are finished in mahogany; the public space is laid with encaustic tiles, and the artificial heating is by means of hot-water piping and coils. In the rear are the manager's consulting and strong rooms; additional spacious safe-accommodation is provided in the basement, all fitted in the most approved manner. The remainder of the latter story is devoted to clerks' luncheon-room, lavatory, and conveniences. The upper stories give comfortable accommodation to the bank's residents, which are approached from both streets. The works were carried out by Messrs. Shafte and Barry, of York, from the designs and under the superintendence of Mr. John Gibson, of Westminster.

A WAYSIDE INN.

PERHAPS no subject has taken so much with the members of our Designing Club since we commenced the second series as the one for which we give the selected design to-day; at any rate, the contributions were not only more numerous than usual, but the character of the foremost of them was very nearly of equal merit. We have already remarked upon the several plans, leaving little to be said here. The selected design is by "Motto J.," whose drawings herewith will explain themselves. We shall publish the design by "Mechlin," which was awarded the second place.

THE LOGIC OF ARCHITECTURAL DESIGN.

For a description of these sketches see our report of Mr. H. H. Statham's lecture on p. 185, and also last week's number, p. 159.

OLD HOUSE IN DERBY

This house is in the Wardwick, opposite the new free library, from an upper floor of which the drawing was made. It had formerly a greater frontage to the main street, having a third bay, but when the Cross-street was made or widened the gable and bay were taken down and rebuilt on the flank. It was erected in the first half of the seventeenth century. The way in which the supporting wall is cut away by the opening is worthy of remark.—WM. RD. LETHABY.

THE ENGINEERING OF WATER SUPPLY.

THE water supply of our large inland towns is a matter of such moment that any information bearing upon the question has a more than usual interest. Two papers on the supply of water in Australia were read and discussed on Tuesday week at the Institution of Civil Engineers. One paper dealt with the Geelong water supply at Victoria, and was read by Mr. Edward Dobson, Assoc. Inst. C. E. It appears that in 1871 Lieutenant-Colonel Sankey, R.E., reported to the Victorian Government, recommending the construction of certain works, namely—an open channel from Wallace's Swamp to the Stony Creek reservoir; a storage reservoir at the head of the creek, 26 miles from Geelong, with a capacity of 754,000,000 gallons; a brick-lined aqueduct, communicating by a natural water-course with a small pipe head reservoir at Anakie Gap, holding 1,330,000 gallons; a 13½ mile length of 12-inch and 14-inch main, leading from the pipe-head reservoir to the service reservoir; a service reservoir, to hold 6,000,000 gallons; filter beds; several miles of mains, including 42 miles of sub-mains, varying from 12 inches to 3 inches in diameter. Geelong has a population of under 25,000, including the suburbs, and Colonel Sankey's plans contained provisions of some interest. One of these was that the water should not be allowed to rise within 15 feet of the by-wash until all subsidence of the dam had ceased; another, that relieving reservoirs should be constructed to lessen the pressure on main between the pipe-head and the service reservoir, and that there should be a by-pass at the service reservoir to allow of its being shut off for repairs without interfering with the town supply. Mr. E. Dobson, as resident engineer, carried out these works, and his paper furnishes some useful information respecting the failure and repair of the Upper Stony Creek reservoir. He attributes its failure to an injudicious selection of site, or rather foundation, a frequent cause of similar casualties. The puddle wall had subsided, and the face of dam slipped in consequence. In repairing the dam the water and slush were pumped out below the outlet, a new by-wash was cut 17 feet lower than the original, and the stone from the cutting was used to fill up the slip, while the slope of the bank was made 4 to 1 instead of 3 to 1. Describing the lower reservoir dam, Mr. Dobson says it is of concrete, erected in a gap at the lowest of the reefs which divide the valley into basins. It stores 142,000,000 gallons, and has 42 feet depth of water over the outlet pipe. The foundation of dam rests on vertical strata of slate and limestone. In the composition of the concrete the following materials were used; broken sandstone and cement mortar, made of pit sand and Portland cement, in the proportions of 2-inch metal, 4½; screenings, 1½; sand, 1½; cement 1. Short tunnels had to be driven through spurs in the gorge of the Stony Creek, consisting of vertical strata of limestone and slate. Their size was about 6 feet by 3 feet, and the cost a little more than £3 per lineal yard. Both lithofracteur and ordinary blasting powder were used. In the work of pipe laying an immense amount of labour in crossing creeks and weirs, boring and retaining walls, was undertaken, and as a regular gradient could not be obtained, the bottom of valley was followed to the mouth of the gorge, then the spurs were tunnelled through, and it ascended by a steep incline, so as to obtain the shortest route to the tunnel's mouth, without rising above the gradient. This was fixed at 4 inches per chain for the 9-inch pipes, and at 2 inches per chain for the old 14-inch pipes. They had to deliver

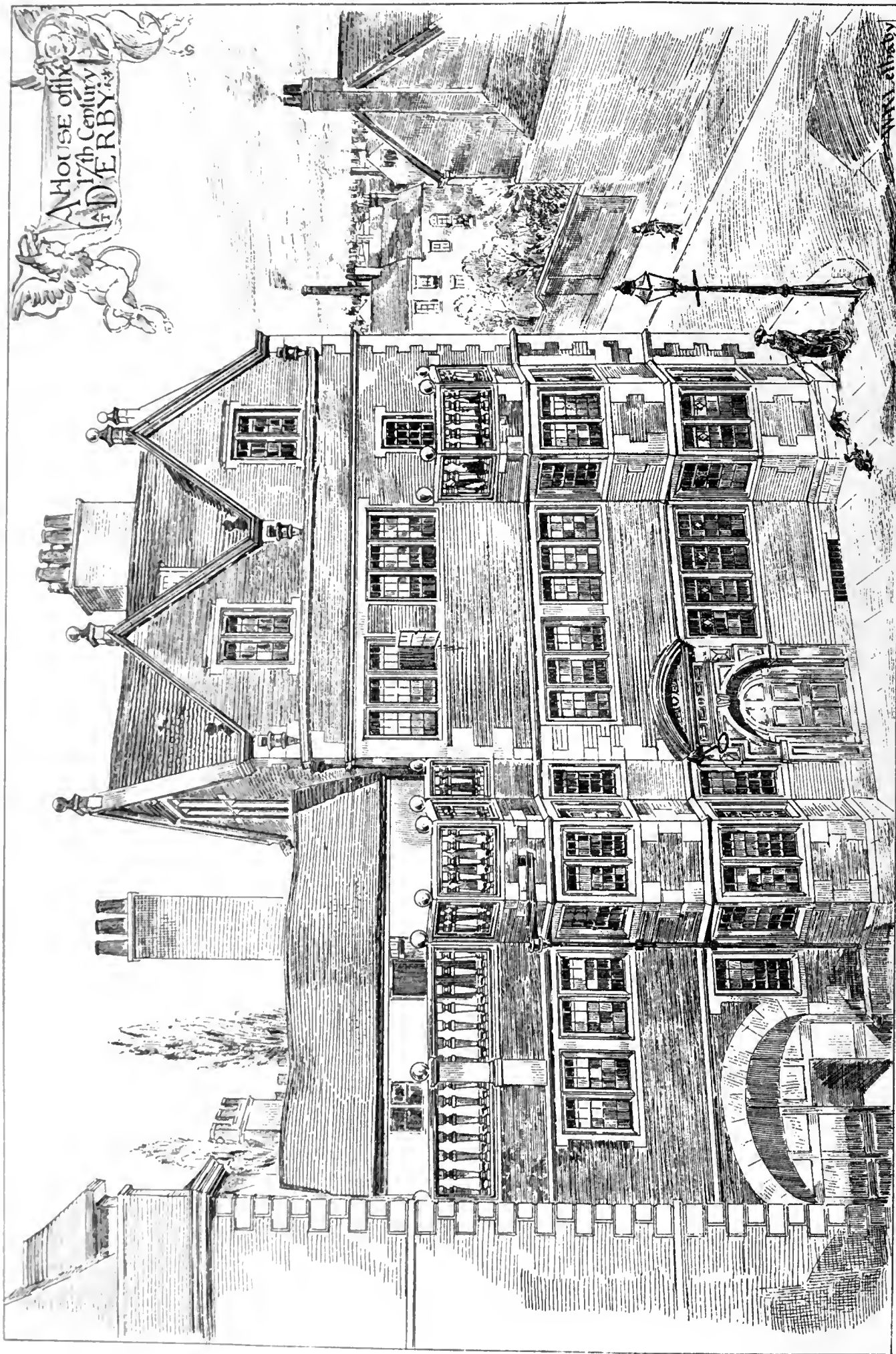
720,000 gallons every twenty-four hours. Blow-off cocks were attached to the mains at the principal summits. The average cost of laying was less than 11s. per yard; this included cartage of pipes, 24 miles, retaining walls, &c., but was exclusive of cost of tunnels and cost of pipes. We have no space to enter into other details. The second paper, on the "Sandhurst Water Supply, Victoria, Australia," by Mr. Joseph Brady, M.I.C.E., dealt with the construction of storage reservoirs and filter beds he had designed for the purpose of the extension of the water works. Sandhurst, we may remind our readers, is the central town of the Bendigo gold field, and is about 105 miles north-west of Melbourne. The population was 35,000; the average rainfall for 13 years was 23.13 inches, and the city is of considerable elevation. Before the year 1858, Sandhurst was supplied by rainwater stored in small iron tanks above ground. With regard to the details of the reservoirs given by Mr. Brady, the surface level at Big Hill reservoir was 991 feet above sea level. Its area was 18 acres, and gathering ground nearly 4,000 acres. The formation was schistose. The dam was of earthwork, with a centre puddle wall, 350 yards long, 30 feet high in centre, and abutted on abrupt hills at the ends. Its cost was 1s. 7½d. per cube yard, and of the puddle, 4s. 9½d., and it contained 77,000 cubic yards of material. The top width was 12 feet at 5 feet above the highest water level, the slopes being 3 to 1 inside covered with gravel and 2 to 1 outside soiled and grassed. There was a by-wash for surplus water, which discharged into a valley, and the outlet was by a 7-inch east-iron pipe, well protected, and fitted with a brass delivery valve, of Guest and Chrimess pattern. The Crusoe reservoir had a capacity of 330,000,000 gallons; its area was 80 acres; and its greatest depth, 40 feet. The dam, of earthwork, is 700 yards long, 12 feet wide at top, and 47 feet high; its cost was £25,400. The slopes are 3 to 1 inside, and 2 to 1 outside, the former covered with rough stone pitching and gravel, and the latter grassed. Provision was made for shrinkage. The by-wash was obtained in a depression of the hills, the surplus water discharging into a lateral valley clear of works. The outlet was a cast-iron siphon, 18 inches diameter, and 515½ feet long, the inner leg being 206½ feet long, the crown, 88 feet, and the outer leg, 221 feet. This siphon did not cross the dam at right angles to a vertical plane, but was laid on its side. It finished with a bell-mouthed end in the lime-pond of the settling works, under a constant head of 4 feet of water. At a level of over 800 feet, the discharge of water was 4,500 gallons per minute. The filter beds were described, but we need not refer to these, beyond saying that the lime process was used, and the maximum daily supply delivered was 200,000 gallons. The wages were high, bricklayers being paid at the rate of 12s. per day, and labourers at 8s.

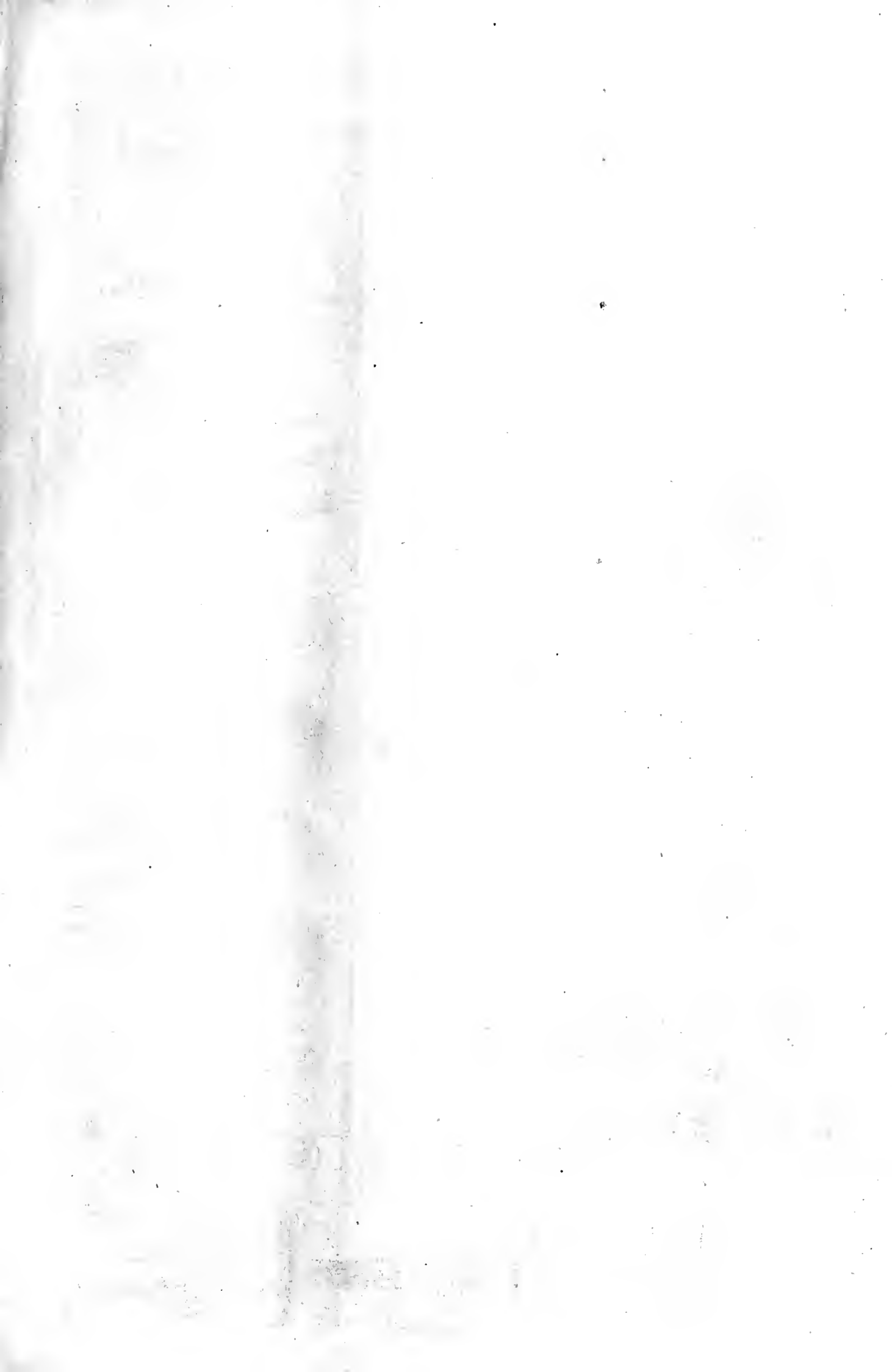
THE collection of maps, plans, and views of London and Westminster, made by the late Mr. Frederick Craze, and lent to the South Kensington Museum by his son, Mr. J. G. Craze, which we have already noticed, is now on view from 10 to 4 daily in two of the upper rooms in the galleries on the west side of the Horticultural Gardens. The plans and views selected from the collection for exhibition are 3,085 in number. A complete catalogue, compiled from Mr. Craze's larger work, has been issued, and may be purchased in the Museum.

A Local Government Board investigation was held at Redhill, on Saturday afternoon, with reference to the quality of the water supply by the Caterham Spring Water Company. A handbill, entitled "Typhus Fever," has since been circulated in the town. It states that it has been represented to the Mayor that the Caterham water has been accidentally contaminated so as to render it at present unsafe for domestic purposes, and persons are cautioned against its use for drinking or cooking.

The Waterford Harbour Board having obtained from the Treasury the promise of an advance of £40,000, in such sums as may be required, for the construction of a dry dock, will proceed with the works forthwith.

A new organ was opened at Brentwood Congregational chapel on Sunday week. It was built by Messrs. Hill and Sons, of Camden Town, at a cost of £380. The choir-chamber before the organ and situate behind the pulpit has been rearranged and other structural alterations carried out by Messrs. Winter Brothers, builders, of Brentwood.





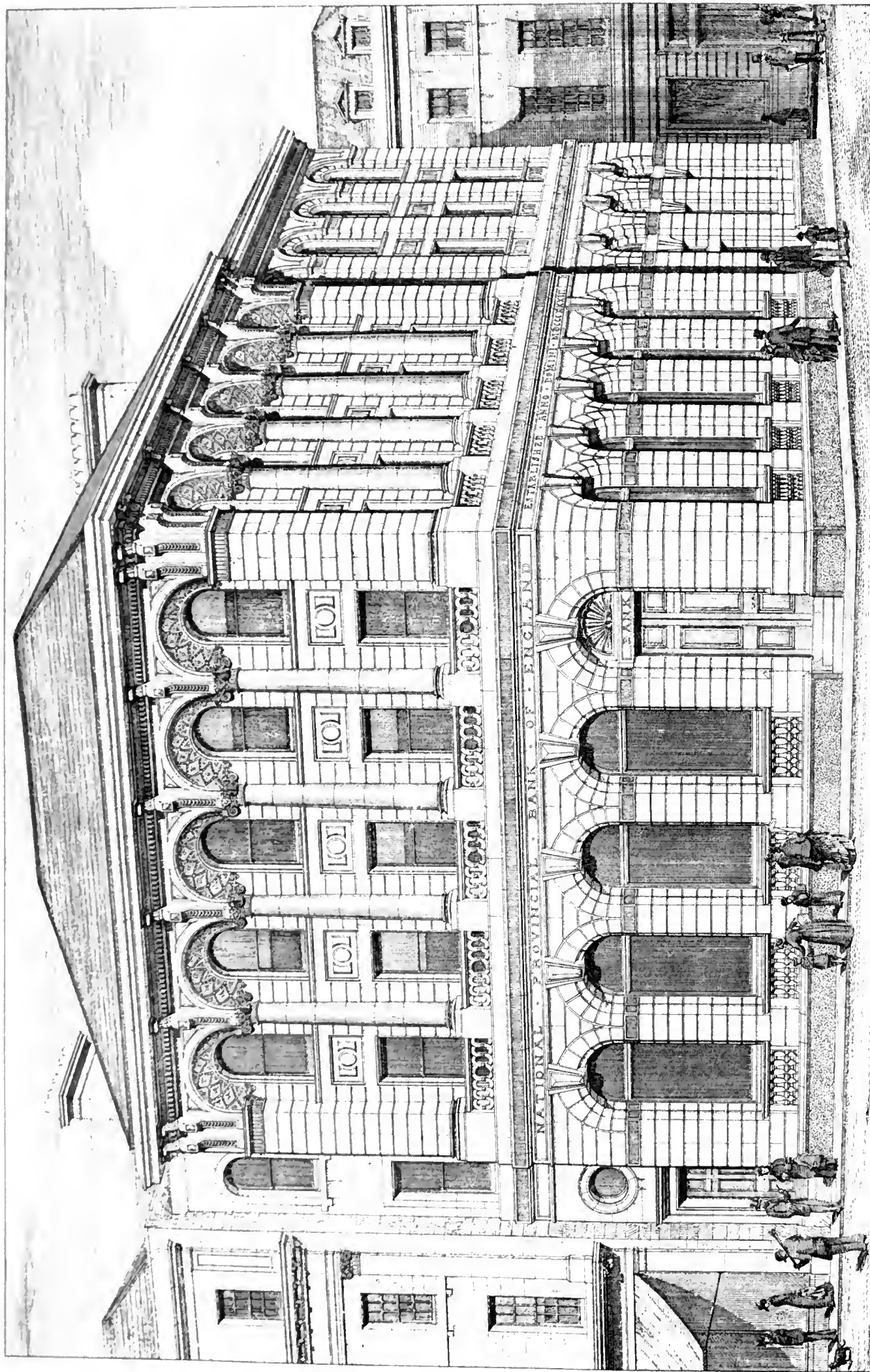
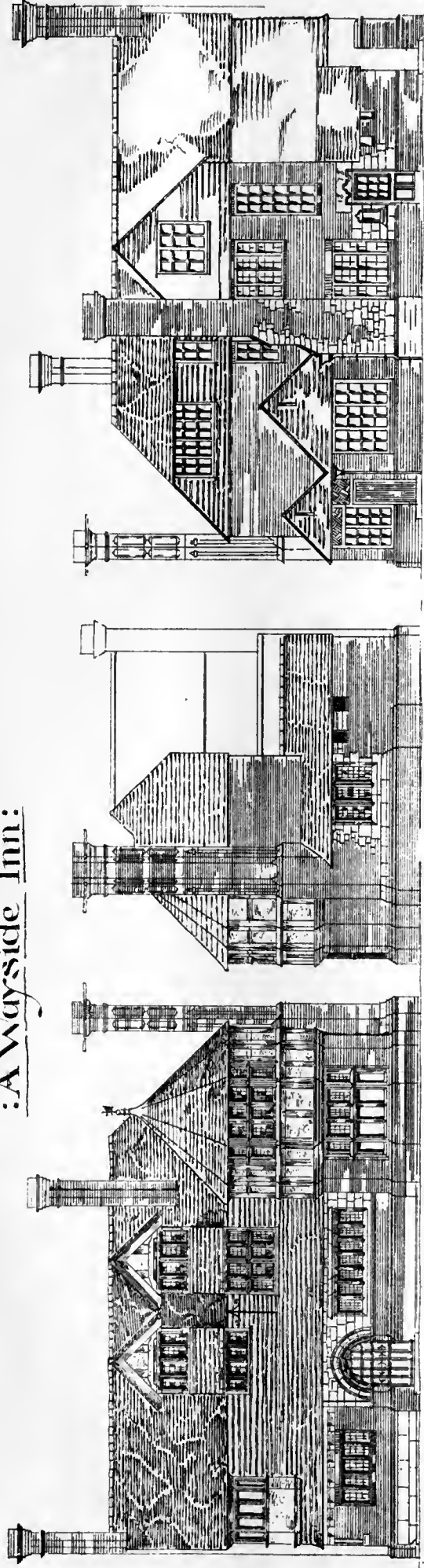


Photo Engraved & Printed by James Alcorn, 6, Queen Square, W.C.

NEW BRANCH PREMISES FOR THE NATIONAL PROVINCIAL BANK OF ENGLAND, SUNDERLAND. JOHN GIBSON ARCHITECT

'Building News' Design^{ns} Club:

:A Wayside Inn:



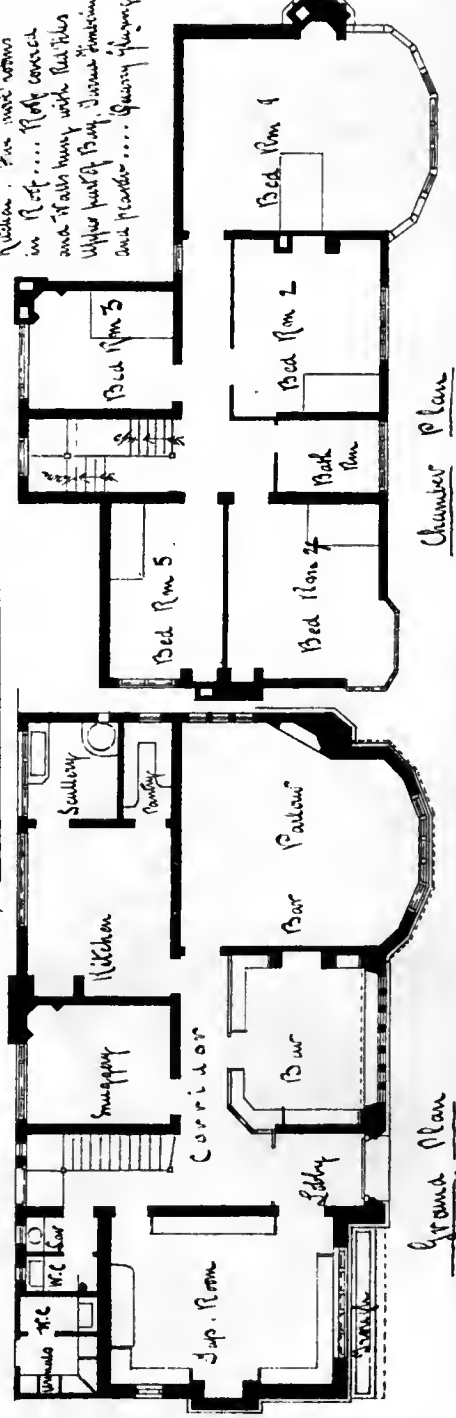
Front

Side

Back

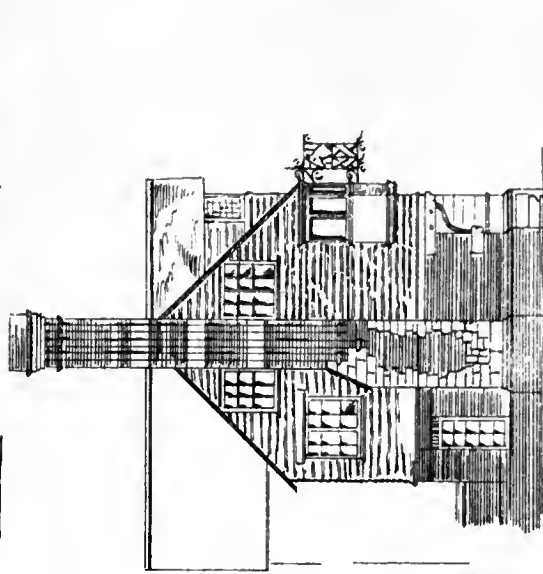
SELECTED DESIGN

40' 0" 10' 0" 20' 0"



Ground Plan

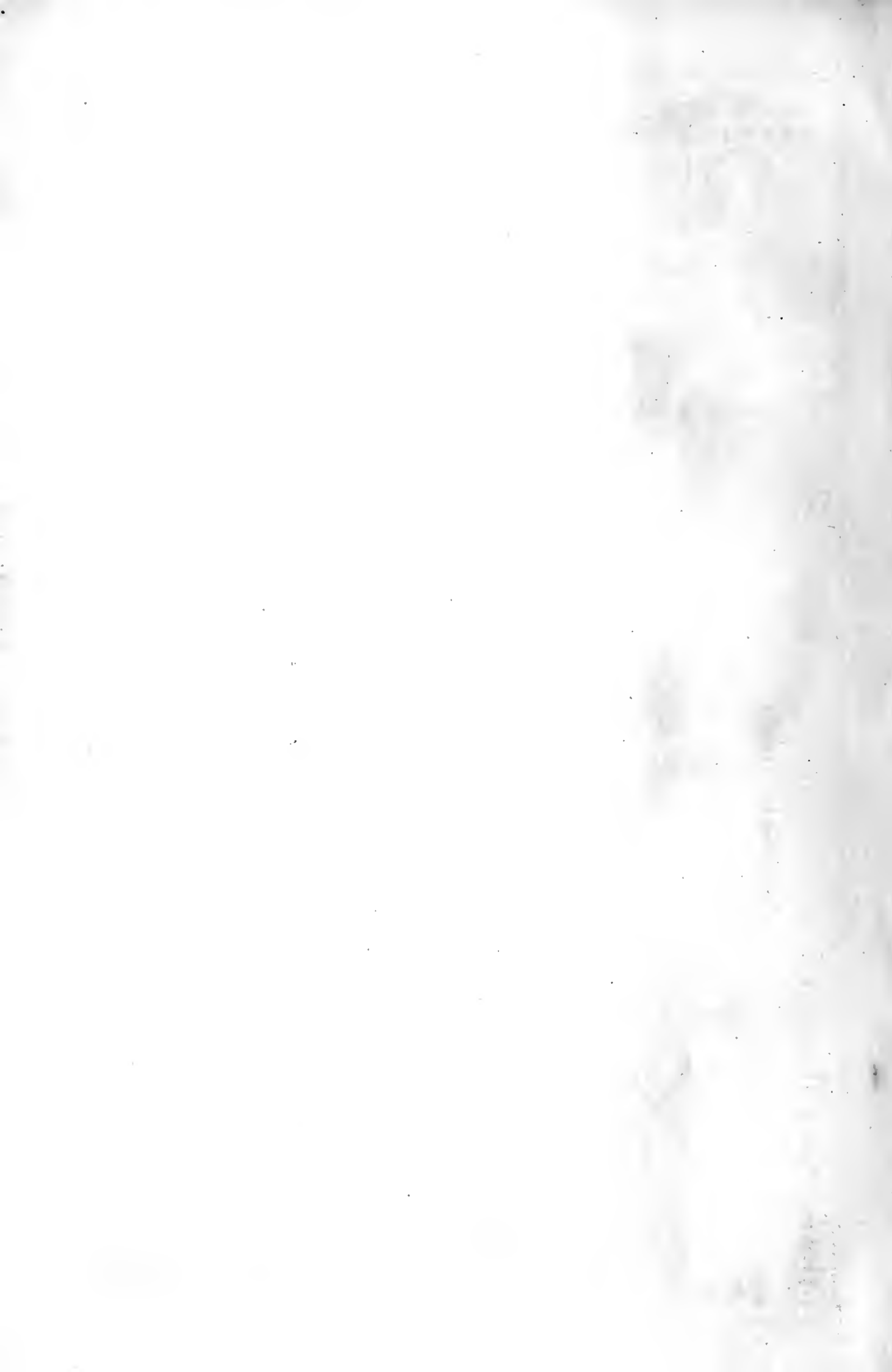
Chamber Plan

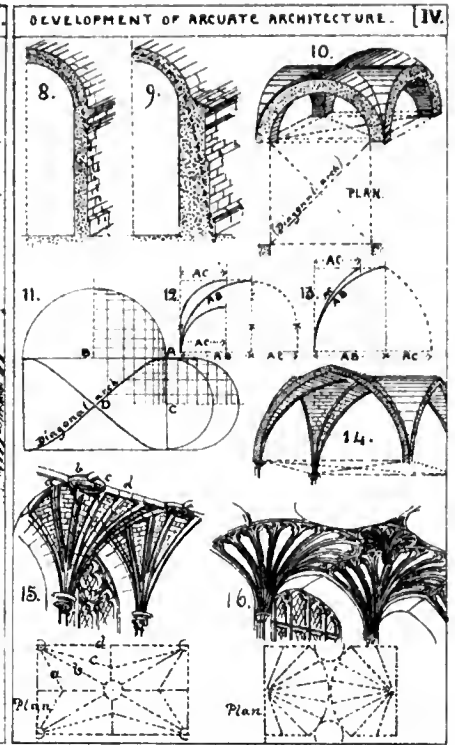
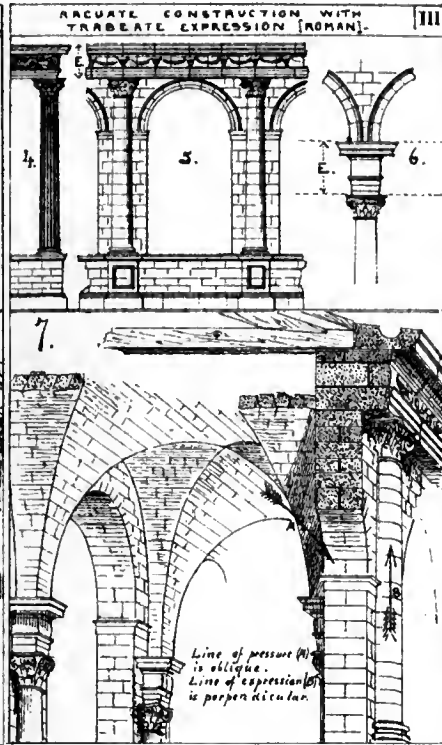
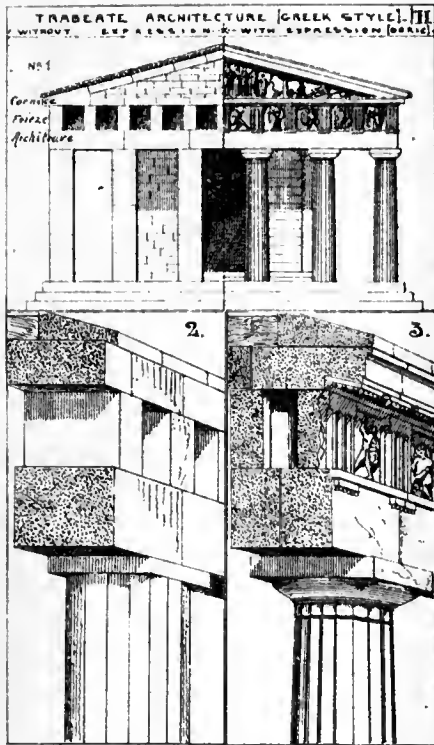


Side

Model. 1 Year's day 1879.

Photo Engraving & Printed by James Alderman, 6, Queen Square, W.C.





MAXIMS OF ARCHITECTURAL MORALITY. I.

Architecture being based on practical requirements can only be true and logical so far as it is in accordance with and expresses the real needs of the community.

II.

The plan of the building is the basis of the whole design. A good plan is one in which the various departments are arranged and combined in such a manner as to ensure the greatest convenience and the best possible effect.

III.

The exterior grouping and design of a building should arise out of and indicate the interior plan and arrangement.



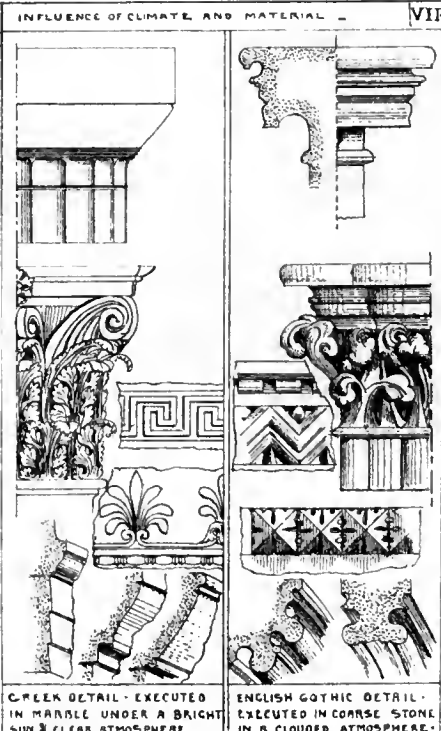
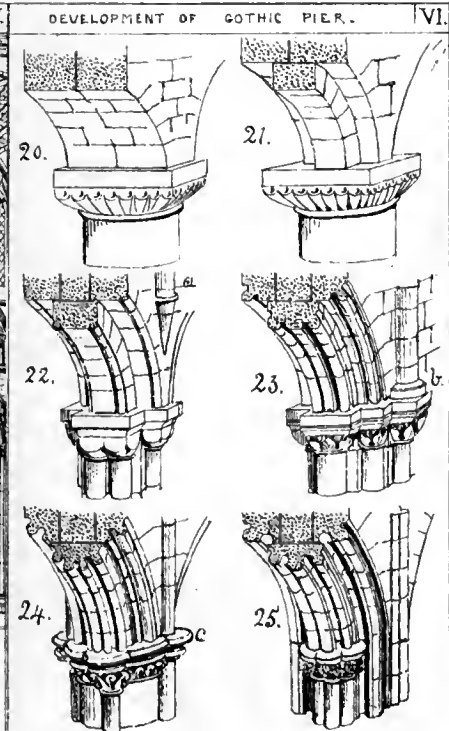
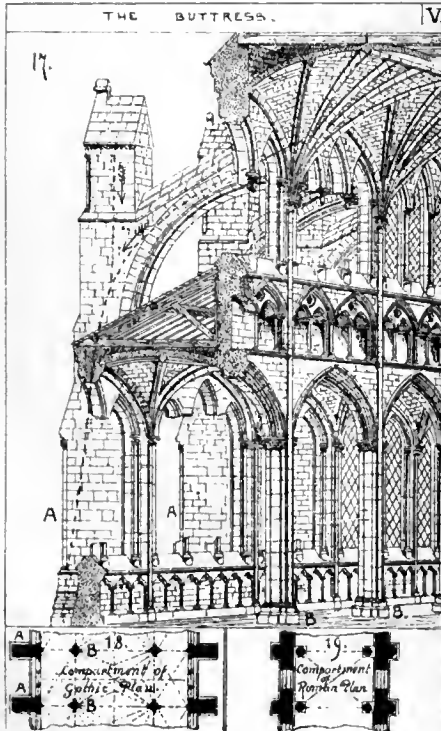
IV.

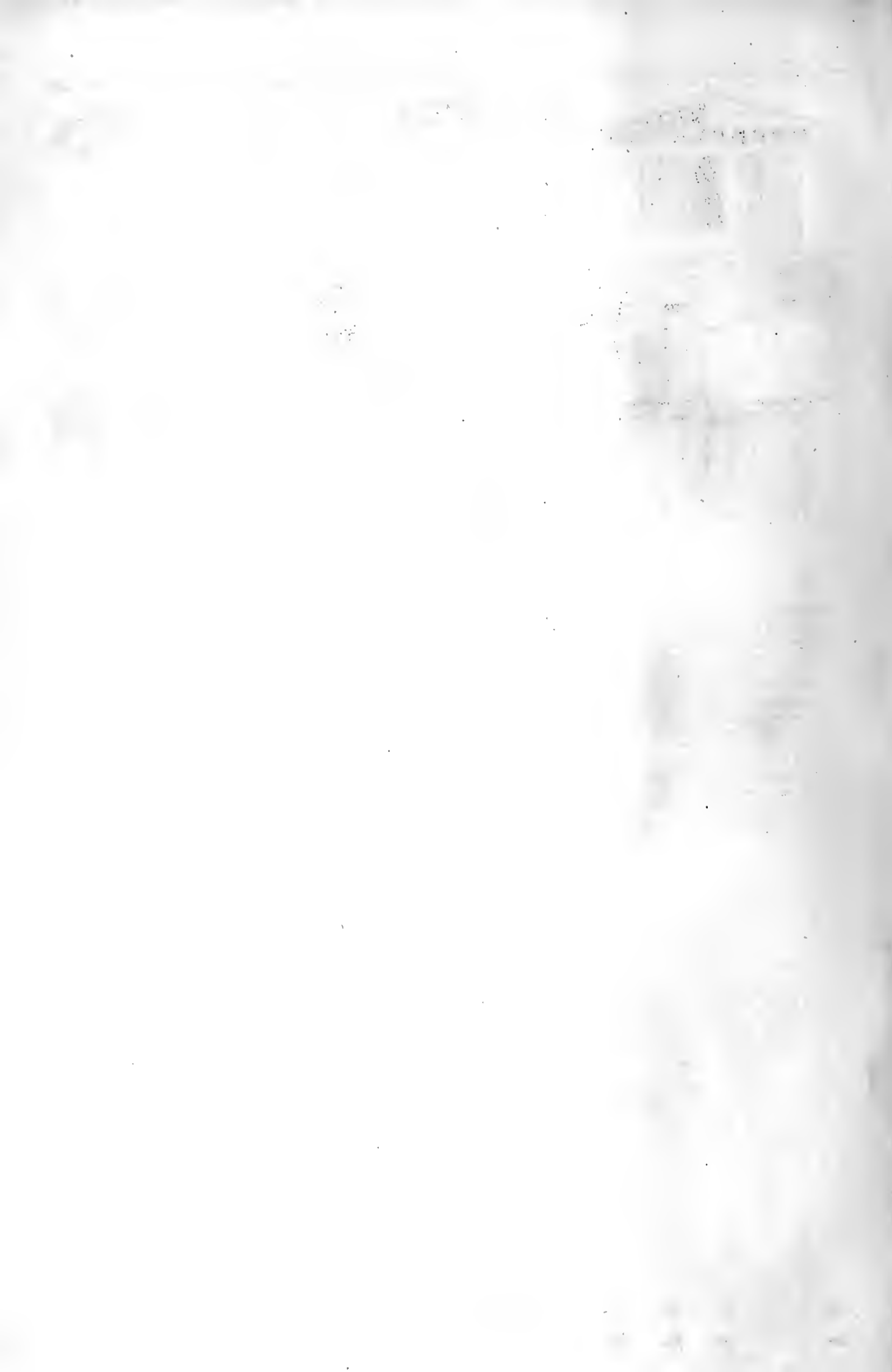
The architectural design (both internal & external) should arise out of and express the scientific construction or the "plastic" of the building.

Ornament must be so introduced as either to emphasize the construction or to be manifestly independent thereof and must be designed with reference to the material in which it is to be executed and the climate under which it is to be seen.

V.

No feature not arising out of the plan or construction can be added to the architectural design of a building under the pretext that it is "ornamental." Such a feature is an architectural falsehood.





NOTES ON ST. PAUL'S CATHEDRAL.*

(Concluded from p. 133.)

The *prima facie* points which make against the Oxford plan No. 1 of the Old and New Cathedrals of St. Paul, are—firstly, that it does not fit our new discoveries; secondly, that the internal detail is drawn in an obviously careless manner, the pillars of the central tower alone seeming to have been properly laid down, and the rest merely sketched in hap-hazard; and, lastly, the curiously oblique lines of the fronts and ends, &c., already noticed. The last-mentioned *prima facie* doubtful point is, however, really an evidence of the accuracy of the plan. The second is nothing more than inattention to a detail which had nothing to do with the gist of the drawing, and the first-named misfit has arisen from the fact that the draughtsman was put out by an irregularity of which he had no previous experience, namely, a deflection of the axis of the choir from that of the nave. This appears to be the solution of the whole difficulty, and when the drawing is corrected for this peculiar arrangement everything fits in its place, and the oblique lines are all of them reduced to their proper square directions. And now the plan becomes intelligible, but I have additional evidence, and will here quote a passage from the "Parentalia."—"The reasons for changing the site of the Church and taking up all the old foundations are chiefly these:—First, the Act of Parliament for rebuilding the City had enacted that all the high streets (of which that which led round the South side of St. Paul's was one) should be 40 feet broad, but the old foundations straitened the street towards the East end to under 30 feet. Secondly, the Churchyard on the North side was wide, and afforded room that way to give the new Fabrick a more free and graceful aspect. Thirdly, to have built on the old foundations must have confined the Surveyor too much to the old plan and form: the ruinous walls in no part were to be trusted again, nor would the old and new work unite or stand together without cracks. It being found expedient therefore to change the foundations, he took the advantage of more room Northward, and laid the middle line of the new work more declining to the North-East than it was before, which was not due East and West, neither did the old front of the Cathedral lie direct from Ludgate, as it does not at present, which was not practicable without purchasing and taking down a great number of houses and the aid of Parliament. This, tho' much wished for, he was not able to effect. The Commissioners for rebuilding the City had in the first place marked and staked out all the streets, and the Parliament confirmed their report, before anything had been fully determined about the design for the new Fabrick. The proprietors of the ground, with much eagerness and haste, had begun to build; accordingly an incredible progress had been made in a very short time; many fair and large houses erected, and every foot of ground in that trading and populous part of the town was highly estimated." It is here then stated, upon the authority of Sir Christopher Wren, that the axis of the new Cathedral was set more declining to the North-East than it was before. But how if the Cloister wall shows that the Nave declined to the South-East instead of the North-East? Sir Christopher Wren was not a man to be mistaken in a matter of East and West but he may have put down to irregularity, which he more than once mentions in connection with the Choir, the deflection of its axis, and with it the North-Easterly tendency of the whole Cathedral. These bearings are as follows:—

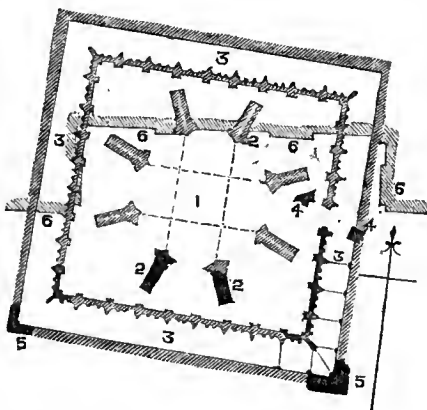
The New Cathedral to the North-East	6° . 28'
The Old Cloister wall and Chapter House to the South-East	0° . 53'
But the general axis of the Cathedral to the North-East	3° . 15'

That is on the assumption that the Oxford plan No. 1 correctly shows the correlation of the old and new fabric at the east end. That this was correctly marked on the plan, both at the east and west, I have scarcely any doubt; but as the whole of the foundations of the choir must have been removed, our only chance of proof from the spade will be in the possible discovery of the

foundations of St. Paul's cross, of which I by no means despair. But there is nothing unreasonable in the idea of a deflection of the axis. In the case we are contemplating, it must have been certainly large—not much less than 4°. There is, however, in a fine abbey church—Whitby—an instance very much more considerable.

To tabulate such cases as are known to me—	
Whitby	6° 20'
Old St. Paul's, hypothesis	3° 55'
Lichfield	1° 45'

St. Mary's, Oxford, has 3° 20' deflection. The above all incline to the north, which is the general direction; but there are instances of deflection to the south. Other cathedrals may be cited for a smaller amount from my own observation: I may name York, Norwich, Peterborough, and Lincoln, as designed by Bp. Remigius, but afterwards the axis was straightened by Grostete; also to a small but very perceptible extent St. Peter's Cathedral at Rome. If we assume the old nave to have been square with the west front, and that its central line was correctly shown on the plan, and then set it out on this hypothesis, not only do the cloister and chapter house agree very nearly indeed with their real places, but the south wall of St. Gregory's church falls centrally upon a piece of foundation, which was discovered in the alterations made six years ago at the west end. The strongest argument is to come. On the hypothesis that the position of the nave must be so, to be corrected, I a few days ago dug in the north churchyard for the traces of the north transept wall, and found them in the very first pit, within two



CLOISTERS AND CHAPTER HOUSE, OLD ST. PAUL'S.

- REFERENCES:
- | | |
|--|---|
| 1. Chapter House. | 5. 5. External Angles, Cloister Wall. |
| 2. 2. Buttresses. | 6. 6. Wall of present Cathedral. |
| 3. 3. 3. Cloisters. | (The recent discoveries are shown in darker outline than the rest of plan.) |
| 4. 4. Loose Fragments of Foundation buried deep. | |

feet of the centre of the hole. The whole of the work west of the tower is thus shown to be in accordance with the plan after correction in the manner above explained, and the axis of the transept agrees in direction with the plan, and all this comes by moving it on the western extremity of the axis as a pivot. We must conclude that the eastern extremity had the same relation to the present cathedral that the plan shows, and this implies the deflection of the axis of the choir. The deflection we are supposing could not have been continued without much inequality in some of the choir arches; some must have been spread out and others contracted. On this point we have Sir Christopher Wren's evidence, taken from the "Parentalia," p. 274, "Lastly the intercolumniations or spaces between the Pillars of the Quire next adjoining to the Tower are very unequal." This is exactly what must have occurred with a deflected axis. The Oxford plan, No. 1, shows the axial lines as coincident at the extremity of the old choir. This would seem a very probable arrangement. But in stating this we must not overlook the words of the Parentalia, quoted above, that Sir Christopher Wren took advantage of more room northward, &c. The Oxford plan, however, as it stands, shows a larger area of the new cathedral to the south of the old; whereas the amended plan gives the preponderance, although only a small one, to the north side. I claim, however, that the first purpose and end of that plan is that it was intended to show the axial deviations of the two cathedrals, and that it placed them at

the east and west extremities correctly, whatever it did elsewhere; and if so, there must have been the deflection of axis which I have spoken of. It is to be observed further that the plan as drawn shows the eastern wall very oblique to the axis of the cathedral, and the correction of the axis in the way proposed brings it very nearly square. Thus the only way to reconcile this plan with the new discoveries, if we retain the eastern points of coincidence, is by a deflection; and if there was no deflection, a plan which after a simple readjustment has proved itself accurate at the north transept must be entirely discredited as to its representation of the east end. The arguments against the deflection are the silence of Sir Christopher Wren on the point, and that straight axes are shown on this and in the other two plans, viz., Hollar's and Loggan's (for the Oxford plan, No. 2, lacks authenticity), and the words of the Parentalia that "The Surveyor took advantage of more room northward," may be quoted in this sense; but this last point is neutralised by the consideration that the same passage speaks of the axis of old St. Paul's as declining north of east, which would not have been true of an undeviated axis, for it has been demonstrated that the axis of the nave did not decline to the north-east at all. Besides the orientation would then have been so nearly true that he would scarcely have said it was not so without some qualification. The confirmation I hope for may perhaps come from the foundations of St. Paul's cross. This interesting structure is shown on the Oxford plan, No. 2, and the place is confirmed by several old perspective views. It is true that the plan we are now considering gives an impossible extension to the choir, but the compiler was probably influenced by Stow's figure of 690; but I think his place for St. Paul's cross about opposite the buttress dividing the second and third bay of the choir, and its distance from the cathedral itself may be allowed to have much weight, especially as he has rendered the due proportions of the chapter-house to the cloister, which neither Hollar's nor the Oxford plan, No. 1, have properly represented. The plan of the cloister (see opposite) shows the exact position of the foundations we have recently discovered, and their relation to the present cathedral. It will be seen they include the two southern of the eight great buttresses supporting the chapter-house, and of the internal cloister-wall, the four south bays of the east side, with the return angle, and also the south-western angle; besides these, traces were found of both S.E. and S.W. external angles of the cloister. I have a few remarks to make on the bells which have lately been added to the cathedral and hung in the north tower. This tower, although in the general view of the cathedral it does not seem a large object, now contains, all on one level, twelve bells, which Sir Edmund Beckett considers the heaviest peal that can be rung. The tenor is 62 cwt., and the total peal weighs about 272 cwt. The original floor, which seems to have been calculated for a much lighter peal, had in consequence to be strengthened. This has been done by powerful struts, two from each face of the tower, meeting in a quadrate collar arrangement, which strengthens the whole floor. The timbers are large, generally 18 inches deep, and some as much as 16 inches broad, either oak or of teak. The frame also is very solid. The effect produced by the swinging of the enormous mass of metal composing the peal is almost nil. I have, whilst the ringing was going on, placed my hand between the timbers of the frame and the stone work of the tower, and have felt nothing more than the slightest possible palpitating movement, very similar to that of my pulse and scarcely more perceptible. The bells were cast and hung by Messrs. Taylor, of Loughborough, and are the gift of the Corporation and some of the leading Companies of the City of London. The position of the scheme for the embellishment of St. Paul's is this: A sub-committee have recommended the adoption of a design left by Mr. Alfred Stevens for the pictorial treatment of the dome in mosaic. The President of the Royal Academy and Mr. Poynter have agreed to assist the Dean and Chapter and the committee in carrying out this design, with such modifications as the proper selection of the subject entails, and they are now considering the proper means of carrying out the proposal, which is to begin by a full-sized cartoon placed up in the dome itself, so that the scale of the work may be thoroughly settled and adjusted to its proper situation. This work, both preliminary and final, will neces-

* A Paper read by FRANCIS CHAMBER PENROSE, M.A., Past Vice-President, before the Royal Institute of British Architects, January 27th, 1879.

sarily take a considerable time. In connection with the embellishment of the Dome, it may interest the members to consider a very curious evidence of thought on the part of the skillful and scientific designer of the Cathedral, which I found when making the careful measurements of the configuration of the cupola which was requisite for this undertaking. These measurements for the section were taken with the help of the theodolite, and in several ways, so as to check, or I may rather say confirm, one another, so that I have no doubt of their accuracy within some fraction of an inch. Having got the measurements I was soon able to make out a system of three centres with radii about 67 feet, 46 feet, and 60½ feet, which afforded an exceedingly close approximation to the figure. But I spent a great deal of time in endeavouring to make out a law of design combining these centres and radii. At last it struck me that the arc of a parabola which should be a tangent to the sloping side of the drum at the springing, and of which the central line or axis of symmetry inclined to the horizon at an angle of $51^{\circ} 30'$, might afford a probable solution. These data, combined with the springing and culminating points of the Dome, enabled the elements, as they are called, of the curve to be calculated, and when done, although it differed a very little from the contour of the dome as executed, it explained the theory of the centres and radii which I had been seeking—absolutely. The correspondences are here exhibited:—

After adjusting the measured and the calculated dimensions at the bottom and top, that is at the springing point and the circular eye of the dome, we have for the equivalent heights	Feet.		Feet.
40-30,	$\left\{ \begin{array}{l} \text{a difference} \\ \text{in horizontal} \\ \text{measure of} \end{array} \right\}$	.03	
" " " 13-40,		.00	
" " " 37-65,		.06	
And at the height of about 55-00 feet, where the horizontal measures have been equated, a difference in vertical measure of		.06	

The centres and radii are thus determined. If we first suppose the theoretical parabolic arc to be drawn and the angle formed between its inclined axis and the base of the cupola be bisected, namely by the angle of $25^{\circ} 45'$, the point where this line cuts the curve is taken as a given point in the section, and it is found that a radius of 66-60 feet with its centre on the springing line will join this point and the springing point of the cupola. Draw this arc and continue it upwards about half as far as below the point. If this centre be now joined to the point where the parabolic axis meets the vertical central axis of the dome, and the latter be taken for the centre of the second sweep, the junction of this with the first will be on this line produced. The radius will be 46-10 feet, and the sweep will extend 13° on each side of the parabolic axis, and then it will merge into a third sweep of which the centre is again on the springing line, and which will complete the section. The radius 66-60 feet is also the radius of curvature, as it is called, due to the parabola at the middle of the arc formed by its aid, and the last radius is also that due to the parabola at the termination of the whole section by the eye of the dome, and the central radius of 46-10 differs only a few inches from the radius of curvature at the apex of the parabola. The angle of inclination of the parabolic axis is the latitude of the place. The proof of the correctness of these views has been given by the practically perfect agreement between the calculations and the measurements given above, of which the discordances never exceed three-quarters of an inch, and I have compared many more points than are above tabulated, and have taken two complete sections of the dome with corresponding results.

The experiment at the Southampton docks has been lighted during the past week by the Wallace electric light. The shed is about 300ft. by 80ft., and is said to have been brilliantly lighted by three lamps, notwithstanding the absorbing effects of the black concrete floor and unwhitewashed roof. A single Farmer-Wallace light was also placed outside at the north-west angle of the open dock. No particulars have been made known as to the cost of the experiments.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the meeting of the Institute held on Monday, the President, Mr. Charles Barry, in the chair, the following gentlemen were elected:—As Fellows: Alexander Peebles, Salter's Hall-court, Cannon-street, E.C.; Henry Dent Lomas, Norfolk-row, Sheffield; Thomas Archer, Buckingham-street, Strand, W.C.; Arthur Green, Buckingham-street, Strand, W.C.; Samuel Knight, Cornhill, E.C.; and William George Coldwell, Finsbury-place (South), E.C. As Associates: George William Webb, Castle-street Reading; Wallace Gill, Fountain-buildings, Bath; Henry Blackwell, Old Broad-street, E.C.; and Leonard Brisbane Brown, Aberdeen-place, N.W. The President read a communication from the Foreign Office stating that it has been decided by the King of Bavaria to hold quadrennial exhibitions of works of art at Munich; the first of these will open in July, 1879, and will close in October. The conditions would be placed in the hands of the secretary, who would afford all information to members, but he might add that first and second gold medals would be awarded to works selected by a jury of the artists of Munich; that all works must be delivered by the 31st May next; that the expenses of receiving and returning and insurance will be paid on all accepted works, but the expenses of those declined will fall on the owners.

ST. PAUL'S CATHEDRAL.

The President said Mr. Penrose's paper on St. Paul's Cathedral (see pp. 132, 133), was now open for discussion. The exact date of the mouldings of Old St. Paul's found, and how far they coincided in character with the received period of working, were questions which a few years ago would have excited the liveliest discussion in that room. As to the decoration of St. Paul's, all would be glad to know that the marble pavement had been commenced. The design exhibited was, he thought, an admirable one, and he could only hope that the whole work would be carried out as shown. It was a happy augury that two such masters of their art as Sir Frederick Leighton and Mr. E. J. Poynter had undertaken to prepare designs for the dome.

Mr. WHICHCORP inquired whether the tower was strong enough to bear the ringing of the peal of bells.

Mr. STATHAM wished to know what effect the proposed mosaics in the dome would have on the aerial perspective of the cathedral. One of the last things their late hon. secretary wrote upon was this point, for Mr. Cockerell thought the cartoons might reduce the apparent height of dome. He believed that the mosaic floors would partially neutralise this.

Mr. E. B. FERREY referred to the extraordinary variations in the contemporary views, plans, and descriptions of Old St. Paul's. The irregular intercolumniation which Wren condemned might have partially arisen from the practice of Gothic builders to set out the bays nearest a central tower to a narrower span than the others, so as to afford greater support to its mass. Again, there might have been a variation therein arising from different dates of building nave and choir. Mr. Penrose's theory of the deflections of the axes was very ingenious. The small size of the chapter house, only 33ft. diameter, was very remarkable in so large a cathedral, especially as compared with similar structures at York and Westminster.

Mr. DAWSON asked whether the cloisters were not truly square on plan. He also inquired whether Mr. Penrose had found any remains by which he could fix the coincidence of the east ends of the old and new cathedrals. If the plans were incorrect in this particular, there was no reason to assume that the axes of old nave and choir deviated.

Mr. ROBES suggested the question whether gilding and colour would not diminish the apparent size of the dome. Stevens's idea was to introduce into the dome groups of architectural ornaments from eight points, and to unite these by circles. The arrangement, size and colours of these rings would need the most careful consideration.

Mr. BOYES did not see from the plans and discoveries the necessity for Mr. Penrose's theory of deflections of axes in the nave and choir of old building.

The President, in closing the discussion, asked Mr. Penrose if, in his researches, he had found any similar cases in Classic or Gothic

work, where a dome was developed from three centres. It should be remembered that Wren always contemplated the introduction of colour into the dome, and that he probably made full allowance for it in designing. Mr. Penrose, in speaking of the deflection in Old St. Paul's, had referred to numerous other Gothic instances, all of which showed inclinations to the north. Now, the deep earnestness and feeling with which the Gothic architects worked, made it certain that there was a well-understood and common cause for the custom. A possible reason occurred to him, namely, that it might be a reproduction of the leaning of our Lord's head on the cross, shown in all representations as inclining to the right.

The Rev. BENJAMIN WEBB (hon. associate) said in his younger days he should have agreed with this hypothesis, but he believed any deflection was due to mistakes in setting out the foundations. If, however, this deflection was invariably to the north, the President's idea was probably right.

Mr. PENROSE said there were no grounds for alarm as to the effects of bell-ringing in so massively constructed a tower as that wherein the bells were hung. He believed the effect of filling the dome with mosaics would be to increase the apparent size. The two spandrels already treated seemed to him to look broader than the plain ones. The dome never looked so small as when there was a fog in it. The new pavement referred to in the paper was that of the crypt only, and not the nave, as several speakers seemed to assume. It had been prepared in the female prison at Woking from full-sized drawings which he had made; he thought the cost was about 4s. per foot, but this estimate was subject to correction. It was in contemplation to repave the cathedral floor proper as funds permitted. The old chapter house was a little larger than the drawings had led Mr. Ferrey to suppose; it was nearly 40ft. diameter. The old chapter house seemed to have been repaired and again used after the Fire, and Dr. Simpson, the cathedral librarian, had just found that in the reign of James II., meetings were held in the old room. The cloisters, as Mr. Dawson suggested, were not set out square; the bays of one side differed in size from those in the next, but corresponded with those opposite. He had fixed the relative position of the old and new east ends from the Oxford plan No. 1; he was now excavating to find the north wall. The peculiar curvatures of the dome appeared to have been determined upon by Wren, because a spherical vault appeared when viewed from beneath to hang down near the centre; the centres and radii he had shown were probably an after-calculation made for the guidance of the workmen in constructing the dome. The deflection of choir from nave was nearly always to the right (it was so at St. Mary's, Guildford, where it amounted to $3^{\circ} 30'$), but in a few instances, as at Wisbech, it inclined to the left. One reason for the deflection might have been a desire to improve the perspective by causing the distant lines of columniation to approach each other; the beauty resulting in this manner from the change of axis was very apparent in Lichfield Cathedral.

GREEK ART AND GREEK GEOMETRY.

A Paper by Mr. JOHN PENNETHORNE, entitled "The Connection between Ancient Art and the Ancient Geometry, as Illustrated by the Works of the Age of Pericles," was read for the author by Mr. Arthur Cates. The paper was written to show the connecting links between ancient art and the geometry of the Greeks, and to prove that complete harmony exists between the few passages in the writings of Plato, of Aristotle, of Vitruvius, of Philo, and of other authorities which refer to the theory of ancient art, and the facts deducible by measurement from the architectural remains in the Athenian Acropolis, which were calculated and executed by the architects of the age of Pericles. The works of the period were executed with such extreme precision that we are able from them inductively to recover the original canon of proportions of the Athenian porticoes by simply eliminating the small irrational quantities found to exist in the whole height of each temple and in the heights of steps, columns, and entablatures, when compared with the length of the upper step in any given portico, and by substituting instead the nearest commensurable magnitudes. When these small irrational quantities are effaced, all

the Greek porticoes harmonise, and can be calculated in what is really the given Athenian canon of proportions of porticoes. Thus: divide a line into 24 parts, and let the length of the upper step of the octastyle = 10 parts, of the hexastyle = 8 parts, and of the tetrastyle porticoes be = 6 parts. Let the whole height of the Doric porticoes = 5 parts. Let the whole height of the Ionic porticoes = 6 parts. In the Doric porticoes the whole height is found to divide into 9 aliquot parts: The height of the steps = 1, of column = 6, and of entablature = 2 parts. In the Ionic porticoes the whole height is found to divide into 12 aliquot parts: the height of the steps = 1, of column = 9, and of entablature = 2 parts. In the Doric and Ionic porticoes the total horizontal projection from the frieze to the lower step is made equal to 1-9th of the whole given height of the porticoes, then for the details of the steps, of the entablature, and of the inclination inwards of the first masses, the whole projection is divided into some given number of aliquot parts, and the details of the projections are regulated by these numbers. Great care was taken by the architects in the arrangement of the position of the propylæa, the roads of approach, and sculpture surrounding the principal designs, so as to suit certain points of view. The temples were generally surrounded by external colonnades supporting an enriched entablature, and the external appearance of the design was very carefully studied.

(To be Continued.)

THE LOGIC OF ARCHITECTURAL DESIGN.*

WITH ILLUSTRATIONS.

NOW, it is out of these three difficulties—that of getting the line of pressure within the flanking mass, of vaulting oblong spaces, and of maintaining bend near the keystone of the arch—that what is known as Gothic architecture grew. That pointed arches were first used for scientific, and not for aesthetic reasons, is clear from the fact that in the Transition or Romanesque churches all the large arches which carry weight are pointed, while the smaller ones introduced for ornament are round. Vaulting was now rendered a more easy matter, for the two arches could, if pointed, be struck from different heights, and yet form a good juncture, as in 13, 14. Upon this angle all the weight depends, so that it was presently noticed that this should be emphasised by a rib, and that the space between being of no structural importance, could be treated as the architect liked, by hollowing it out or setting the masonry askew. More and more ribs were added to the vaulting, as in Fig. 15, until the groining developed into the fan vault (Fig. 16), of which well-known examples exist in Henry VII.'s Chapel, Westminster, and at St. George's Chapel, Windsor. The last development marks a long and very important step, as will be seen from the plan of a fan vault. In this mode of groining all the ribs are of equal length, rise at equal distances, and diverge at equal angles. For the first time the vaulting is perfectly logical. The fan vault is such a pretty thing that it looks like mere play, and it has often been said to have been derived from an attempt to copy the interlaced branches of trees in a forest; nevertheless, it is the outcome of a couple of centuries' thought and experiment. In this last form of groining the fans themselves are mere ornament, disposed upon an inverted cone. What these would be like if unclothed with tracery may be seen in the roof of the approach at the High Level entrance to the Crystal Palace, which may be regarded as an engineer's conception of fan vaulting. In Figs. 18 and 19 we have made a comparison between the plans of Roman and Tudor vaulting. Another diagram shows a half section and half elevation of a Gothic building and a Roman building. In the latter building it will be seen that the walls run lengthwise, and the older Greek constructional forms are retained. In the Gothic building the walling is set edgewise, as buttresses, and arranged opposite the lines of stress. It would be quite possible to build a Gothic edifice as a simple series of buttresses supporting a groined vault, and, practically, many of the French cathedrals are

constructed in this manner, from a love of stained glass and a desire to obtain as much space as possible for its display. Owing to the thrust of vaulting it became necessary to bring more weight into buttresses, and this was the origin of pinnacles. From the elevation of a bay of a cathedral (Fig. 17) upon the wall you will see how strictly logical it is in arrangement and subordination of parts. But we must now pass on to consider the growth of the Gothic column and its capital. Fig. 20 shows the earliest form in which a circular column supports a square head and arcade, as at Waltham Abbey and a few other buildings. In Fig. 21 it will be seen that partly to get greater lightness in effect, and partly to allow of smaller stones being used, the upper arcade has been diminished at its base. The next change was to break the column up at Fig. 22 into smaller ones, so that the bulk is arranged just where the weight is required to be carried. In 23 the vaulting shaft is brought down at *b* to capital, and in 24 it is continued through to base of building, but bound in to the capital and column at *c*. In Fig. 25 you see a further and later example of grouped shafts upon a pier. It will be seen that it is perfectly easy to connect this last shaft with a Doric column by a series of gradations. The differences between the two are traceable to the relation between material and climate. The left-hand-side of plate VII. shows a Greek capital, built in a country where marble is abundant, where the climate was sunny and clear; hence the temple was fashioned with exact repetition in the two sides, and in the later Corinthian examples every detail was worked out with extreme delicacy. The Early English capital on the opposite side was executed under a thick climate, and in a coarse-grained stone; hence the several features were almost gashed out. That is the reason why the buildings in the Greek style, erected about 50 years ago, look so cold and uninteresting. Any attempt to reproduce that style in London would have this result, unless the Greek climate could also be introduced, and marble quarries opened, say at Redhill. But I must pass on to notice the logical influence of plan upon architecture. Upon the screen is a plan and perspective of the Houses of Parliament. This is a very fine plan in many respects. All the corridors converge in a central octagon, and this is architecturally expressed by the spire which rises in the middle of the building. The very large tower is placed at one of the angles to denote that this is the grand entrance. Now if Sir Charles Barry had been desirous of making his building in the first place symmetrical, and had put another Victoria tower at the other end (as I have heard some people say he ought to have done), he would in effect have said, "This is a building in which there are two grand entrances of equal importance." The clock tower is treated in a utilitarian manner as simply a means of raising a clock in the air. The lower part is therefore little more than a stalk, marked with emphatic vertical lines, and spread at the stage containing the clock. These towers are placed at the extreme ends of the building, so that it is possible to estimate its size from any standpoint. It would not be easy to find a better example of an illogical mode of construction than the building in which we are now assembled. As you know, on the front of the Institution next to Albemarle-street is a series of Corinthian columns. Internally it is, however, divided into a number of small rooms, and an entrance-hall and staircase leading to this theatre at the rear, and there is absolutely nothing to show that one portion of the building is of greater importance than another. The only logical building behind such a front would be one large square hall. Again, if you look at a section of St. Paul's Cathedral you will see that it is constructionally a Gothic building behind a Classic mask, with the masses disposed so as to rest upon a series of arched buttresses carefully tied in. But in the time of Sir Christopher Wren every building of importance must have the orders applied to it; it was then considered almost as unbecoming to erect a building without the orders as for a person to go without clothes. Upon the first a second order was erected at St. Paul's, and this is but a huge blank wall piled up to hide the flying buttresses supporting the central vault. On entering the cathedral you see this is the case, for there is a lofty middle vault and a low aisle on either side (in one of these you will recollect they have smothered the Wellington Monument). There is

another sketch on the screen; you will see that it is a part of a bridge, and that on a solid granite column set upon a buttress is a stone and timber house three or four stories high. The pier is substantial enough to carry a much greater weight, but now as I remove the upper sheet of the drawing you see that the granite shaft simply carries one of the recesses of Blackfriars Bridge! What a waste of architectural expression! Had the masonry been needed to increase the solidity of construction, it ought to have been disposed as a buttress in the line of the stream's flow, but as it is it simply carries an airy balcony. It is an instance of a mistake often made in engineering work. Our engineers will not learn anything about the principles of architectural design, and at the same time they will apply ornament to their works. If the materials were simply massed together in the lines and forms of greatest strength they would often look well, for they would approximate to the harmony of nature. Now I have spoken upon the true laws of architectural design, and have referred to some vulgarities of conception, and it may be asked what is the practical application to ourselves? During the past fifty or sixty years we have been taken up with the imitation of the various phases of past architecture. Roman, Greek, Gothic, in all their varieties—the last beginning, curiously enough, with Tudor, as that presumably most suited to modern requirements, and gradually worked backwards in the search for purity till something very like Norman was attempted—each has been tried, and the present fashion known by the name of that peculiarly æsthetic sovereign, Queen Anne, is just as illogical as any of the others. It is now correct to reproduce on your fireplace the façade of a Classic temple with the orders under an architrave, tympanum, and roof, all complete for the protection of the front from rain, and then you may scoop out the centre of the pediment to afford space for a bracket on which to set up a Japanese pot! And this is art in the house! The cause of these vagaries is that few people take the trouble to think what are the reasons for these things which they see every day, and consequently we are at the mercy of anyone who can get a new thing taken up by a few of the leaders of fashion. Architects are not entirely to blame for this; we can hardly hope for better architecture until there is a demand for it, and for this reason it is necessary that people of culture should be induced to think out the matter logically, to wish for what is right, and to say so. True, it is possible to live upright, moral lives, and even to be very happy while living in the midst of all that is unæsthetic. In the same manner a lady might be very charming, well-informed and possessed of natural attractions, but you would feel regret if she were to dress in so old-fashioned or unbecoming a manner as to make a "fright" of herself. The illustration applies to architecture at the present day. It is worth while to have our taste widened and cultured by examining into the reasons for details, and I shall consider I have done something for the advancement of architecture if I can induce such an audience as I have the honour of addressing to-night to give some attention to the architectural design.

At Stratford Police-court Mr. Martin, of Stratford-grove, was recently charged by the West Ham Local Board with erecting a building in Argyle-street, Plaistow, beyond the building line, and also with erecting the same without submitting the plans for the approval of the Board department, was fined £5, and a continuing penalty of £1 per day was imposed until plans should be supplied which could be approved of.

The council-chamber in the Guildhall, Derby, has been rearranged and rendered more commodious. The woodwork and fittings were executed by Mr. Morley, of Forester-street, and the upholstery by Messrs. Cochrane and Dean, also of Derby.

Mr. G. C. Ashlin, architect, of Dublin, has been elected an Associate of the Royal Hibernian Academy of Arts.

A new workhouse chapel was recently opened at Orsett Union-house, South Essex. It has been erected by Mr. Wilder, contractor, of Gravesend, from the designs of Mr. Charles Pertwee, of Chelmsford. It seats 120 people. The altar, desks, seats, and roofing are varnished pine. Above the altar is a reredos of three panels of slate, the centre one gilded with a cross on a ground of French grey, and the other two with sacred monograms. It is heated by hot water.

* A lecture delivered by HENRY HEATHCOTE STATHAM, F.R.I.B.A., at the Royal Institution, January 31st, 1879. [Concluded from p. 160.]

COMPETITIONS.

MATLOCK CHAPEL COMPETITION.—There were 183 applications for instructions in the above competition, and 85 sets of designs submitted. The plans were to be sent in on or before Feb. 1st to Mr. J. S. Holkinson, Secretary. At a meeting of the committee held on the 5th inst., it was decided to award the first prize (£20) to the design bearing the motto, "Thorough," and the second (£20) to "Liverpool, January, 1879." The authors of the first prize design are Messrs. Dixon and Moxon, of Barnsley. The proposed outlay is £2,500, and the chapel is to accommodate 400 persons. From a letter in another column it will be perceived the competition appears to have been decided in a very unsatisfactory manner.

ILKESTON BOARD SCHOOLS.—The Ilkeston School Board have provisionally selected the following architects as competitors for the proposed Granby schools to accommodate 300 boys and 300 girls in separate departments, together with teachers' residence:—Mr. A. S. Potter, Mansfield; Mr. Knight, Nottingham; Mr. Keeling, Nottingham; Messrs. Trueman and Pratt, Nottingham; and Messrs. Tait and Langham, Leicester.

THE METROPOLITAN FREE HOSPITAL COMPETITION.—Little has transpired since our last notice of this competition. The Committee have had under consideration, the claim made by Mr. Owens, referred to by us, and having consulted their assessor, Mr. P'Anson, have determined to adhere to their first decision. Mr. Owen's plan possesses merit, though not of a kind to justify a redistribution of the awards. The design "Civis" (Mr. Charles Barry's) has been supplemented since our last notice, by a coloured perspective of the Bishopsgate-street Elevation, showing the alternative design for this front. It is certainly less faulty than the first; red brick and stone are used, and a slight balcony projection obtained up to the top of second floor. The elevation is crowned by a broken ornamental gable, in which the angle quoins are pronounced features. We may notice *en passant* that the Jews' convalescent room, kitchen, and nurses' room are a long way from the wards, and on the third floor the middle ward is made a passage room, to the extreme transverse wards at either end. These are objectionable points. We may add to our comments as regards "Experientia," that though the wards are only lighted on the Half Moon-street side, the author has provided ventilating spaces above the rooms on the inner side, by keeping the ceilings low. In justice to the author we point this out. We understand the committee have been very anxious to acquire the property at the corner, Sir Paul Pindar's house, which breaks into the site, and has considerably curtailed the possibilities of the plan.

LEGAL INTELLIGENCE.

ALLEGED NEGLIGENCE AND BREACH OF CONTRACT.—The Metley School Board v. Gough and Pattinson.—This was an action for negligence and breach of contract, tried at the Leeds Assizes on Saturday and Monday week. Messrs. Pattinson contracted with the plaintiffs to erect two schools, the cost of which was about £5,000. Mr. Gough was the architect. The schools were ready for opening in 1877, and it was then discovered that the contract had not been carried out. The material was of an inferior quality, and the work was an entire departure from the character of the specifications. Mr. C. L. Dresser, C.E., Mr. Geo. Cowson, Ald. Croft, and another witness were called on the part of the plaintiffs to prove that the work was inferior, and not according to the specifications. On behalf of the Messrs. Pattinson, the builders, it was contended that the final certificate of the architect was conclusive. The contract provided that a certificate of the architect showing the final balance due should be conclusive evidence of the works having been duly completed. It was admitted by the plaintiffs that such certificate had been given, and the learned Judge thereupon intimated that he considered that there was no case against the defendants Pattinson, and he directed a verdict to be entered for them. As to the defendant Gough, the architect, the Judge (Lord Justice Brett) said the question was whether he had exercised reasonable care in superintending the builders. Mr. J. P. Seddon said he had carefully examined the schools, and he considered, with the previous witnesses, that they were substantially and satisfactorily erected. He had in a letter to the *Times* recom-

mended the use of slates similar in colour to those used in these schools in the restoration of St. Alban's Cathedral. Mr. Crawford Eyre, who was clerk of the works in the erection of the schools, gave corroborative evidence. Mr. Pattinson, the builder, and Ald. Croft were also called. His Lordship asked the jury to decide whether Mr. Gough had exercised reasonable care and skill in superintending the execution of the contract and in giving the final certificate. The plaintiffs had not impugned the honesty of Mr. Gough's intentions, therefore that consideration would not be necessary, and so far the defendant was entitled to a verdict. The jury returned a verdict for the defendant. His Lordship gave judgment accordingly.

Building Intelligence.

BRIGHTLINGSEA.—The parish church of Brightlingsea, near Colechester, was reopened on Wednesday week after undergoing repairs and restoration. It is a noble Perpendicular edifice, with a lofty tower which serves as a landmark. The roof of the nave and chancel, together with the clerestory, having fallen in about the year 1814, the present roof was then constructed, and at the same time the chancel and chancel aisle arches were rudely rebuilt. Recently the church had fallen into a grievous state of dilapidation. From the designs and under the superintendence of Mr. Charles Pertwee, of Chelmsford, the tower arch has been opened into the nave, the west window and ancient ringers' gallery have been restored, the nave rebeneched and paved, gutters renewed, and roofs of aisles repaired, piers and arches scraped, and walls repaired and coloured, chancel arch rebuilt, and window-glazing renewed. The chancel has also been furnished with choir seats and other appointments, and has been decorated in stencel. An organ has been erected by Messrs. Bryant and Ellis, of London, and the church is now heated by Portway's slow combustion stoves. The works have been carried out by Messrs. R. J. and W. Aldous, of Brightlingsea, at a cost of about £900.

LONDON.—New show-rooms at No. 13, King William-street, Charing Cross, for Messrs. John Hardman and Co., have recently been completed by Messrs. Lott and Son, builders, under Messrs. John and S. Flint Clarksons; the principal show-room, which is 48ft. long and 24ft. high, being on the street level. All the walls, ceilings, and floors are lined with pitch pine in narrow widths; recesses are left, which Messrs. Hardman will fill with typical decoration. The cases throughout, which are dustproof, are of polished wainscot, some of them being iron-plated and guarded by electric alarm-bells. The packing-rooms, &c., are paved with thick Claridge's asphalt. The tubes and the brass, and wrought-iron cages for them, and other work in the gas fittings are from special designs, and have been made by Messrs. Hardman themselves; as also the door furniture and other metal finishings. They have also executed the stained glass exhibited in the lantern lights.

FOLKESTONE.—A new church at Foord, an outstanding district of the parish of Christ Church, Folkestone, was consecrated on Feb. 3rd by the Bishop of Dover. The church, which, when complete, will consist of nave, aisles, chancel, organ chamber and vestries, tower and spire, is built in the Early Decorated style of Architecture, with the local ragstone laid in random courses, with Box-ground Bath stone dressings, the internal walls being lined with rich, coloured, red brickwork, coursed with grey. The roofs are of fir, left clear, without stain or varnish. The windows are glazed with varied tinted cathedral glass. The seating is of red deal, varnished only. The heating with hot air has been most successfully carried out by Mr. John Grundy, of Tyldesley, near Manchester, and has borne the test of the recent severe weather with very satisfactory results. The whole of the works have been carried out from the designs and under the superintendence of Mr. A. Rowland Barker, architect, 11, Buckingham-street, Strand, London. Mr. Burgess Reeves, architect, Folkestone, acting as clerk of works. The building works have been carried out by Messrs. R. and D. Baker, of Tontine and Harbour-streets, Folkestone, at a cost of about £3,500.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

F. Bros.—S. and S.—L. and N. W. R. Co.—B. Bros.—E. T. H.—T. W. C.—M. and Co.—J. and J. B.—M. R. Co.—B. W. M.—W. P.—H. S. B. Co.—W. W.—B. and B.—R. E. C.—T. and H.

BUILDER. (Yes, of the Secretary of the R.I.B.A., 9, Conduit-street, W.)—JINK. (See ndvt. pages.)

H. R. (Indiarubber can be dissolved in mineral naphtha or in bisulphide of carbon. Take the light-coloured parts from the bottle-rubber and cut into fine shreds. Keep the mixture in a warm place, and the rubber will soon dissolve.)

TYRO. (Your comrade is right. It is quite true there are 144 square inches in a superficial foot, but in duodecimal or cross multiplication the inch is taken as the 12th part of a foot, for it really means 12 square inches. The sum of the superficiais given is 175ft. 6in.)—**FAIRBANKS.** (We can recommend a little book entitled "Practical Architecture," by W. Scott Burn, published at office of the *Country*.)—**A "YOUNG ARCHITECT"** (It is best to mount the print on linen stretched to a frame, and to keep the surface of engraving a little away from glass by a gold fillet.)

"BUILDING NEWS" DESIGNING CLUB.

LIST OF SUBJECTS.

A. A cottage hospital for five of each sex, containing convalescent wards, administrative offices, rooms for matron, surgery, and operating-room. Plans and elevations to an eighth-inch scale. A view may be substituted for one elevation.

B. A mantel-piece with pier glass over, which may be combined with shelves for china. Material painted wood. The fire place to have an open grate. Height of room 9ft. 6in., and width of chimney-breast 5ft. 10in. scale.

DRAWINGS RECEIVED.—G. Jacz Bach (we shall be glad to receive your designs, and we hope you will profit by our criticism.) "J. C." in circle, H. Ray, L. in G. Fleur-de-lis, W. J. M., East Anglian, Omnia Vincit Labor, Signum, "Motto J," "G" on shield, "Nemo" in shield, J. Crowquill, T. W. P. (you, like many more, violate the rules in not keeping all your drawings of one subject on one sheet; members are requested to be more particular in this respect), Rebus, Yes or No, Burswell, Try, Demwich, Leo, Rusticus, Thor (your sheet is not of specified size), "M" with leaves, "Be to its faults a little kind," &c., J. S., Spero Meliora, J. Lennox Canning.

Correspondence.

A VERY LIMITED COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—The enclosed is very amusing; you will observe the covert flattery conveyed in the remark, "Your name was one of those mentioned," &c., suggesting the idea that only a select few are to be allowed to compete; but notwithstanding the selectness of the affair, architects must satisfy Mr. Fairbairn by referring to churches already erected by them, and at the same time that gentleman will be glad to get a "note of their terms." I would advise the successful architect to get paid early in the day, as after erecting a church (with tower and spire) to hold 700 people, and hall, boundary walls, &c., very little will remain for that unfortunate man out of the magnificent sum of £3,500. I presume you will agree with me that the architect who engages in this competition has lost all idea of personal and professional dignity.—I am, &c.

Edinburgh, Feb. 6, 1879.

SOUTH U.P. CONGREGATION, GALASHIELS.

It having been resolved to proceed with the erection of a New Church for this congregation, I have been requested by the Managers to procure and submit to them plans by a number of architects for approval. Your name was one of those mentioned to the Managers, and I was instructed to ask you to provide Plans, and to inform you that they had resolved as follows, viz.:—(1), That accommodation should be provided for 700 sitters; (2), That the Church should be after the Gothic style, with spire and bell; (3), That there should be a hall and all modern conveniences in keeping with the Church; (4), That heating should be by water; (5), That sittings (gallery on three sides) should be in circular or horse-shoe form; (6), That platform-pulpit, and accommodation for choir and organ or harmonium behind same, should be provided; (7), That interior should be of yellow pine; (8), That when estimates come to be taken they must be by way of specification, not by schedule; and (9), That the total cost, including boundary walls, &c., and also Architect's fees, must not exceed £3,500. The site secured for the Church is a prominent one, and consists of 80ft. of frontage and about 115ft.

in depth. As it is expected, however, that there will be houses built on both sides, the sufficient lighting of the Church must be kept in view. If you agree to furnish Plans, you will probably be good enough to refer me to any churches of similar construction erected by you or to your plans, in order that their acoustic properties may be tested. As time is of importance, all Plans must be lodged on or before the 15th instant, and it will of course be understood that no charge is to be made for any Plans, except for the Plans which may be adopted, and I shall be glad to receive at same time with the Plans a note of your terms. Should you wish to see the site of the proposed Church, either Mr. Munro, the chairman of the Managers, or I, shall be glad to point it out to you, and to give you any further information you may desire.—I am, Sir, your obedient servant,
F. C. FAIRBAIRN, Clerk to the Managers.
Galashiels, Feb. 4, 1879.

GLOUCESTERSHIRE LUNATIC ASYLUM COMPETITION.

SIR,—I inclose you copy of correspondence relating to the above competition, and will feel obliged if you can find space for insertion in your next issue.

I am at a loss to understand the Building Committee's reasons for refusing to furnish necessary information to competitors. One would reasonably expect them to correct any errors in their "Suggestions to Architects," to which their attention has been drawn (see "Queries 8, 9, 10").

It is very unfortunate that the Committee should shirk their duty, and thus leave competitors in the dark as to their requirements, especially as the "conditions of competition" appear to be fair and reasonable.—I am, &c.,
Durham, Feb. 11, 1879. WILLIAM FOX.

[COPY.]

GLOUCESTERSHIRE COUNTY LUNATIC ASYLUM COMPETITION.

Durham, January 23rd, 1879.

Dear Sir,—I enclose a Schedule of Queries in connection with the above, and will feel obliged if you will kindly fill in answers and return to me at your earliest convenience.—Yours truly,
The Clerk of the Peace. WILLIAM FOX.

Shire Hall, Gloucester,

7th February, 1879.

SIR,—The Building Committee of the proposed Gloucestershire Lunatic Asylum have decided not to furnish any further suggestions or replies to queries to architects.—Yours truly,
FRANCIS EDW. GUISE,
Clerk of the Peace.

W. Fox, Esq., C.E.

(per G. M.)

[We cannot spare space for the list of queries sent, but they are all such as ought to have been answered, and without the information asked for in many, competing would be working at random.—ED.]

WESLEYAN CHAPEL COMPETITION AT MATLOCK BRIDGE.

SIR,—Plans for the above having been asked for in competition, it appears that eighty-five architects responded, the plans being sent in on Saturday, Feb. 1.

On the Monday or Tuesday following the committee were enabled, by their very superior judgment, to decide which of the eighty-five sets were the best, and also which was the second best!

In my simplicity I should have thought that it would have taken some time to arrive at a fair and reasonable selection out of so many designs, but perhaps the solution of the matter may be rendered more easy (as it seems the selection was) by taking into consideration that one set (the first premium) was furnished by the near relation of one of the Building Committee, who is also a large contributor to the funds.

Putting these facts together (the short time taken for the selection, and the relationship of the successful competitor), and considering that there were twenty or thirty superior designs received, can there be any reasonable doubt but that the whole thing has been a prearranged affair? I confess I looked for better things from a set of people who profess to be guided by righteousness and truth in all their dealings.

Further, the instructions were minutely particular on the subject of cost, absolutely stating that they would utterly discard any plan that exceeded the amount named, whereas it is the opinion of competent local and other authorities that the selected design would cost about double that amount, while many excellent designs submitted could undoubtedly done for the money.—I am, &c.,

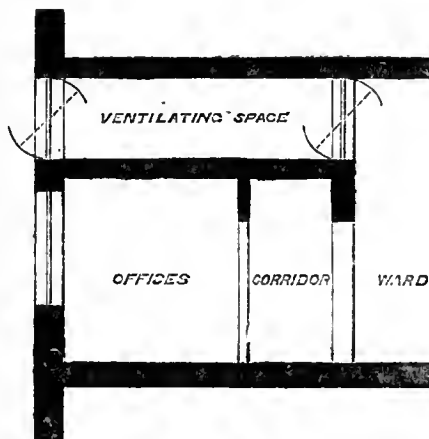
ONE OF THE UNSUCCESSFUL 83.

METROPOLITAN FREE HOSPITAL COMPETITION.

SIR,—May I ask the insertion of a few words of explanation with regard to your criticism on the design "Experientia"?

Not wishing to dissent from its general tone, the writer will find he is in error about the question of cross ventilation to the wards, as it is provided throughout by the means of light directly accessible to the outer air, obtained in the difference of height between the wards and corridors, a plan I believe novel in its application.

I enclose you a small section making it fully clear.



As to the mode in which some of the competitors have acted, that is to unite their forces and thereby obtain a large selection from alternative designs, I will say nothing except that it is novel, but I have my very grave doubts whether the pavilion design of "Ad Rem" comes within the conditions of the competition, and in any event a building of such excessive height can hardly fail to be in its practical working unsatisfactory.—I am, &c.,
"EXPERIENTIA."

PENMAENMAWR, OR BLUE WELSH STONE.

SIR,—Since your issue of Jan. 31, Mr. Allison has kindly forwarded me a copy of the report on Granite Paving referred to in his *exposé* of the Neven Granite Company's Circular in yours of the 17th ult.

He has also favoured me with an explanation, and this, with his complete report dealing more fully with the whole question, convinces me that it was never intended to condemn the particular Penmaenmawr stone which comes under the denomination of "Grey Welsh."

I shall feel obliged, Sir, if you will insert this in justice to Mr. Allison, who I think you will allow is entitled to praise for the public spirit displayed in preventing (with your assistance) corporate bodies and others, who have not the opportunity of obtaining authentic information on this particular subject, from being misled.

I venture to express an opinion also, that his report, if published, would be of interest to those studying the question of the best material for carriage-way paving.—I am, &c.,
MATTHEW JONES, City Surveyor.

Chester, Feb. 5, 1879.

HOTELS AND RESTAURANTS.

SIR,—Through the medium of your journal may I be allowed to supplement by a few remarks, Mr. Frederick Francis' able paper on the above subject, read before the Architectural Association? Referring to the art tiles employed as decorations at the King's Head, may I, as one of the two actual painters of this work, be allowed to state, that I have just designed and painted those additional portions rendered necessary by the enlargement of the premises in Mark-lane.

I must here acknowledge the name of the other painter, M. Alexandre Gravin, who in the original and largest portion of the work designed and painted those tiles constituting architectural arrangements, flowers, birds, fruits, &c., the sole painter and part draughtsman of the entire historical Shakespearian, and other subject work being your obedient servant,
ISAAC A. GIBBS.

I. A. Gibbs & Howard, 64, Charlotte-street,
Fitzroy-square, Feb. 10, 1879.

ENGLISH v. AMERICAN LOCKS.

SIR,—In your paper of last week you insert a letter from Mr. Hill respecting American machine-made locks. Without venturing to say a word against those of Messrs Chubb's manufacture, we may yet, with perfect confidence, recommend those supplied by Mr. Hill, for cubicles and school buildings, for which they are particularly applicable.

The locks are certainly superior to the ordinary cast-iron rim locks. Each lock is numbered, and two keys are supplied with the lock, and in case these are lost or mislaid fresh keys may be obtained by sending the number to Mr. Hill. Besides this, the shank of the key is flat, and not round, as is usually the case with English locks. The consequence is that they are much lighter and easy to carry. At all events, we find both locks and keys have given much satisfaction to our client for whom the school boarding-house at Tonbridge has been erected.—We are, &c.,
WADMORE AND BAKER.
35, Great St. Helens, E.C., Feb. 10, 1879.

Intercommunication.

QUESTIONS.

[5676].—**Orders of Architecture.**—In setting out the orders for workmen, it is considerable labour to go into the very particular parts of modules and minutes as generally given in books. I have in my possession, "Nicholson's Carpentry," published at the beginning of last century, containing a treatise on "The Orders." The plates are very practical, as each of the parts shows at a glance the relation it bears to the others by a series of divisional lines by the side of elevation. Thus, take the Corinthian: the first line would be divided into 94 parts representing diameters; in the second, 11-6 parts would be marked for the capital, and a part for base and plinth, and so on with the smaller members. These plates are rather rough, and I am anxious to obtain a modern work of a similar nature. Will any reader kindly refer me to one?—C. B. C.

[5677].—**Body Colour.**—I have been colouring some large surfaces with body colour; and although whilst wet the tint appears perfectly flat, I find it dries very unevenly, leaving unsightly patches here and there. Will some one kindly give me a hint or two, and greatly oblige?—ONE IN THE DARK.

[5678].—**Painting Cement.**—Having to repainting some cement plinth and cornice, we should be glad if and one would inform us of some material that would stand the weather, and prevent the damp from coming through. What has been done before has, in a short time, peeled off in patches.—W. J. A. E.

[5679].—**Gilding Plaster Casts.**—I have a plaster copy of the celebrated "Milton Shield," same size as the original, and think of having it gilded and framed. Can any of your readers inform me: 1. Is it a proper treatment to gild it? 2. Will the gilding stand, or is it likely to get discoloured or fade? 3. Who had I better get to do it, a picture-frame gilder, or is there a special treatment for plaster casts? 4. Would silvering it be best, to make it more like the original, and would the silvering stand as well, or better, than the gilding?—TYRO.

[5680].—**Clerk of Works' Salary.**—If an architect employ and pay the salary of a clerk of works by request of his client, is the architect entitled to a profit on the outlay?—A. R. I. B. A.

[5681].—**Voluntary Architectural Examinations.**—I am thinking of going in for examination next year, but feel doubtful about the meaning of some of the points mentioned in the instructions to candidates, and should feel very much obliged if any passed candidate would be kind enough to enlighten me. In the first place, with regard to history and literature, "An outline of certain characteristics of the principal historical styles of architecture." How many styles is this to include? Would Greek, Roman, Gothic, and Renaissance be taken to represent a sufficient number, or are more or less required? Next, "The particular characteristics and history of any one style named by the candidate." Should one say Classic, or Gothic, as the case may be, or be more definite and say Greek, or English Gothic, or Thirteenth Century English Gothic (say) or what? There is not sufficient time allowed to admit of any very comprehensive history. Further, in the work to be done at home, "A specimen detail drawing to an inch scale of the work in each trade, and an equal number of full-size drawings to correspond." Now how many trades are to be represented? How is "each" to be interpreted? Would mason, carpenter, and joiner be sufficient? If not, how many trades must be exemplified in this manner?—TYRO.

[5682].—**Cubic Space.**—What is the minimum cubic space allowed to each person in the following buildings, viz., model dwellings in flats (exclusive of staircase), public places of worship, and hospital wards?—HEXAGON.

[5683].—**Cymagraph.**—I wish to have a cymagraph made. It was described by Mr. M. B. Adams and Mr. Sharp in the BUILDING NEWS for 1873. Will some of your readers oblige me with full particulars? What size should parallelograms be from rivet to rivet, and is it indispensable that they are both the same length, width, and thickness of brass bars, diameter of hook, size of board and box?—R. S. T.

[5684].—**Fixing Tiles.**—Can any kind reader inform me how I may fix tiles of 4in. thick at the back and sides of a dog-grate? I have, on several occasions, fixed them where described in various cements, &c., suggested; but at the longest, they remain in position only for about 12 months, being affected, no doubt, by the heat. As the tiles are valuable, I am desirous of fixing them, and any suggestions to aid me in so doing will much oblige.—CALOA.

REPLIES.

[5682].—**Casts of Carving.**—Mr. Harry Hems' statement that pipe-clay is obtained principally near Chudleigh, is calculated to mislead. It is found in the neighbourhood of Newton Abbot, in which town and the neighbouring village of Kingsteignton the clay merchants have their places of business. The trade is entirely in the hands of five or six firms.—J. B.

[5000.]—**Sea-Washed Road.**—The method I should pursue would be to form groynes so as to assist the accumulative power of the tide. These may be formed of the most available material and placed at tolerably close intervals. As deposit takes place the spaces between can be gradually filled up. An embankment of brushwood at the outer side of roadway would be, perhaps, more expeditious, a bank being gradually raised as the materials are to be found. But if no other materials are at hand, the road will necessarily take a certain time to form.—G. H.

[5001.]—**Builders' Charges.**—If there were no plans nor specification, the builder asked to tender has unquestionably a claim, unless there was an understanding that he was to submit a tender at his own risk. It is a question, however, whether a charge for quantities made for the tenderer's own convenience can be made. I think not.—G. H. G.

[5002.]—**Carrying Weights of Bridges.**—To find the carrying weight, it is necessary to obtain roughly the weight of structure itself, adding to this the moving load. If the brick or stone is of good quality, and the arches sound, one eighth of the above load may be safely placed upon it. Much depends on foundations, centre of arch, abutments, besides the crushing resistance of the arch stones, and no rule could be applied without a knowledge of these.—G. H. G.

Our Office Table.

SOME curious particulars transpired last week in the Exchequer as to the manufacture of picture groups of noted people or gatherings. A Mr. Ridley, who called himself an artist, had painted a number of bodies of various sizes and in different attitudes for a photographer named Tuck, who was subsequently to fit heads to them. A dispute arose about an unfinished painting of bodies, which, when supplied with heads, was to represent the Pan-Anglican Synod. The photographer said he was to see a sketch before the picture was proceeded with, but the jury thought the contract was completed, and gave Mr. Ridley the verdict.

A meeting of the Edinburgh and Leith Engineers' Society, held last week, a paper was read by Mr. John Romilly Allen on the "Stability of Dock Walls," in which he described the methods by which failure in dock-walls might be avoided, instancing specially the necessity for the geological formation of the site being studied by means of borings taken during the progress of the work. He stated that by means of careful backing a great economy in masonry might be effected, and that the stability of the wall was greatly secured by having increased batter at the foot, so as to spread the pressure over a larger area at the front of the foundation, where the stress is greatest. The paper concluded by a new method of calculating the stress on a dock-wall, which was simple and practical.

At the fortnightly meeting of the Liverpool Engineering Society, held on Wednesday, Jan. 29th, Mr. M. E. Yeatman, president, in the chair, a paper was read by the Hon. Sec., Mr. W. W. Squire on "The Construction of Timber Dams." The paper dealt with two forms of coffer dam, viz.: Double sheet piling with clay puddle between the rows of piling; and single sheet piling caulked and shored up on the inside. The details of each were described and illustrated by diagrams based upon the most recent practice. Pile driving was fully entered into, together with the preparation of the timber for piling. Various shoes suitable for this particular work were described, and their comparative cost given. Some particulars of the lengths of timber that can be obtained were given, and the wearing of piling was discussed. Caulking was next considered, and the paper concluded with some remarks upon drawing piles and the removal of the clay by dredging.

THE freedom of the Turners' Company was presented on Monday to Sir F. Leighton, the President of the Royal Academy, and Mr. Charles Manby, the Secretary of the Institution of Civil Engineers. Sir F. Leighton, in his reply, reminded his hearers that it was to the earliest application of the principle of the lathe—the potter's wheel—that the world owed the greatest sum of delight and instruction in varied, expressive, and decorative forms. What a fund of loveliness was in the pottery of the most gifted artistic races, and what a mine of character in all. What an instructive contrast there was, for instance, between the bulbous homeliness of British earthen vessels, and the tapered elegance of the produce of Japan and Persia, or the more balanced perfection of the pottery of Greece. It seemed to him as far as artistic temperament is concerned, one might read the character of a people in its pots and pans. But if we further

considered what we owed indirectly to the potter in the artistic adornments of which his art has been the vehicle—when we remembered that the vase-painting of Greece had brought us into more immediate contact with the genius and intimate life of the supreme artistic race than the greatest achievement of its sculptors—we should more fully feel our debt to that humble potter's wheel which, with a past sense of its importance, the turners had so prominently painted on the blazon of their company.

THE forthcoming part of the *Transactions* of the Royal Irish Academy for their department of Polite Literature and Antiquities is devoted to a memoir, by Dr. Graves, Bishop of Limerick, on a remarkable Ogham inscription, found on a stone monument from the Kilteen of Aghlish, a disused burial ground, in the parish of Minard, in the county of Kerry. The monument, in addition to the Ogham inscription, has also inscribed upon it an Irish cross. The outline of this cross is formed not by straight lines, but by arcs of circles, and the cross itself is surrounded by a circle. Examples of it occur on fifth or sixth century Christian monuments in Ireland, and it may be seen worn on the breasts of Irish children on every anniversary of St. Patrick's Day, whence it is often called Patrick's Cross. The question of the probable origin from an Eastern source of this form of cross is discussed in the memoir. There is also to be found on this monument a remarkably disguised form of a cross, known to antiquaries as a *swastika*. The Ogham characters are distinct, and the Bishop has little doubt as to reading them as follows—"MAQ MAQA—APLOGOD," the first two words being on the right, the third being on the left hand side of the stone. A great deal of interest attaches to the determination, after very careful consideration, that the third word is the Ogham equivalent of Aedhlogodh, which is the genitive case of a well-known proper name belonging to a chieftain living in the sixth century, and in the neighbourhood of the place where the monument was found.

MR. WILLIAM HAYWOOD, Engineer and Surveyor to the Commissioners of Sewers for the City of London, has reported to a committee of that body on those parliamentary projects of the present session which affect the City. These are but six in number. The Metropolitan and Metropolitan District Railway Companies introduce a fresh Bill for the completion of the Inner Circle *viâ* Cannon-street, Great Tower-street, and the Minorities, with a spur line to White-chapel High-street. The scheme provides for the widening of the eastern end of King William-street and Eastcheap, and Great and Little Tower-streets in case the Corporation, Commissioners, or Metropolitan Board of Works contribute towards the cost. The London, Chatham, and Dover seek to extend their Holborn Viaduct station nearer to Old Bailey by acquiring some 16 perches of land. The City Union Railways (Outer and Inner Circles Completion) Bill, which proposed to construct an above-ground line from Cannon-street to Fenchurch-street stations, and an underground line from Mansion House to Aldgate has been abandoned. The City Corporation are promoting two Bills, one for the abolition of Leadenhall Market, and the establishment of a new market in lieu thereof, the improvement of the site and neighbourhood and the formation of a new street from Leadenhall-street to the junction of Lime and Fenchurch-streets; and the other for widening London Bridge about 11ft. on each side and improving the approaches. The last Bill is that for the Tower High Level Bridge, promoted by the Metropolitan Board of Works. The Commissioners are recommended to dissent from the whole of the projects in order to obtain a *locus standi* before Parliament.

WE have seen a new blind roller, patented by Mr. W. Luce Hosking, of Ventnor, which is simple, and yet an improvement in many respects on any other we have seen. It is a wooden roller, which can be made in any length, of two halves, semicircular in section. When the two halves are brought together the rib fits into the groove, and between these parts, and over four or more pin points in the bottom half of the roller, the top edge of the window blind is gripped, and the whole secured by a sliding latch, the roller being then round, and in appearance solid, with the blind hanging from one point of its diameter. The cord-holder is a small

circular box, about the size of a halfpenny, for screwing to the window frame; the cord passing down perpendicularly from the roller is threaded through the holder, and when the blind is required to be raised, is pulled down freely, or when lowered is allowed to run up through it. When, however, the blind is wanted to remain to any height up the window, the cord is pulled a little to the right by the thumb and finger, and catching against a loose jaw or cam inside the holder, the cam rises and grips the cord between it and a raised surface inside the cord-holder, till it is again relieved by the thumb and forefinger. The cord can never slip (till required), or the blind run down by its own weight, as with the double cords and rack, as the tighter the pull is on the blind the firmer will be the hold on the cord, which, working between smooth surfaces when in motion, cannot fray or wear. The blind-roller and cord-holder when used in conjunction allow of the blind being raised almost as easily as with a spring roller, without the evils attendant upon the latter. The brackets which support the axles of the roller are similar to the ordinary kind, but one is fitted with an adjusting screw and lock-nut, so that if, through the sinking of foundations a window-frame falls at either corner, the roller can be adjusted in its bearings in a few seconds to remedy this, and allow the blind to properly cover the window.

WE have seen the clay model, executed by Mr. Belt, the sculptor, for the proposed statue to Lord Byron, at the artist's studio, 21, Wilton-plaee, Belgrave-square. The poet is shown seated on a rock, in an attitude of contemplation, his right arm resting upon his knee, supporting his head. A manuscript lies open on his left knee, while in his hand is a pencil. Lying by the side of the rock is the poet's favourite dog, "Boatswain," looking up devotedly into his master's face. We think the sculptor has been successful in the treatment of the dress. There is a careless grace and ease in the lines of the figure and adjuncts. The poet is clad in the customary loose shirt, the expression of the face is thoughtful, and the model is at least broadly treated, dignified, and thoroughly English in conception. Mr. Belt's work has been suggested by the well-known lines from "Childe Harold":

'To sit on rocks, to muse o'er flood and fell,
To slowly trace the forest's shady scene
..... This is not solitude.'

The sculptor has consulted the best authorities for the likeness, and the model is colossal, on the scale of a 9-feet figure. It is intended to place the bronze easting on a marble pedestal 10 feet high, and this is to be given by the Greek Government. As regards the site, we understand nothing has yet been finally settled. The top of St. James's-street, the Green Park, and other localities, have been suggested. Mr. Belt is also engaged on a bust of the late Hon. Eliot C. Yorke and Mr. G. H. Whalley.

THE subject of the work prepared for distribution to the subscribers to the Art Union of London of the present year, is a series of twenty illustrations, by Mr. C. B. Birch, of Lord Byron's poem "Lara," with the text. This poem was chosen for illustration on account of its presenting a large amount of dramatic incident within the limits best suited for a work of this character, thus facilitating the aim of making a series of designs which should, as far as possible, tell their own tale. In addition to this, great advantages are offered by the costume and architecture of the probable period suggested. Mr. Birch is already well known to the subscribers by his statuettes, "A Wood Nymph" and "Whittington." The original marble of the former, life-size, given in 1872 as a prize by the Art Union, was selected as one of the works to represent British sculpture at the Paris Exhibition.

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SMALL-POX, SKIN DISEASES, and many other spring and summer
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Maker, 113, Holborn Hill. Use no substitute.—[ADVT.]

CHIPS.

The restoration of some church paintings at Ecouché (Orne) has brought to light a masterpiece by Mignard, nearly 9ft. in length, which had been missing since the Revolution. Some house-painter apparently had daubed a picture over it.

The ceiling of the nave of St. Katherine Cree church, Leadenhall-street, now undergoing repairs, is decorated with the arms of the senior sixteen livery companies in proper heraldic colours. It is proposed to renovate this exemplification of the companies' arms in connection with the reparations now in progress. The church was built from the plans of Inigo Jones, "citizen and clothworker," in 1628.

New Roman Catholic schools have been commenced at Crewe. Eventually it is proposed to build a church adjoining the schools. The architect is Mr. James O'Byrne, of Liverpool, and the contract, which is of the value of £3,117, has been given to Messrs. Roberts and Robinson, also of Liverpool.

It is rumoured that Mr. Cross contemplates the extension of the Artisans' Dwellings Act to the smaller towns. We doubt if much good is likely to come of the change unless action on the part of the local authorities is made compulsory, and that is not likely to be done by the present Government.

The foundation-stone of a new Presbyterian church at York was laid on Friday last. The cost is estimated at £5,000. The architect is Mr. T. B. Thompson, of Hull, and the contractors are Messrs. Keswick, York.

By special permission of Her Majesty, Mrs. Thornycroft is making, for the Art Union of London, a reduced copy of her fine portrait-bust of H. R. H. the late Princess Alice. A number of copies, in porcelain, will form a part of the prizes in the coming distribution.

The west window of the parish church of High Wycombe has lately been filled with stained glass representing three subjects in the life of our Lord—viz., the "Nativity," the "Adoration of the Magi," and the "Presentation in the Temple." The window is the work of Messrs. John Hardman and Co.

The town council of Derby have increased the salary of Mr. Clement Dunscombe, the borough surveyor, to £350 per annum, as surveyor to sanitary authority, in addition to £150 paid from the corporation.

The Wrexham rural sanitary authority have approved plans prepared by Messrs. Shone and Baugh, civil engineers, for the sewerage of the districts of Stansty and Acton. The outfall is to be on land at Erlas, belonging to Lord Kenyon, and the estimated cost is £4,500. The same authority has obtained the sanction of the Local Government Board to a loan of £5,600 for sewerage works at Brymbo.

Winsham parish church, near Chard, has been reopened after a restoration carried out under the superintendence of Mr. W. Hodder, architect to Viscount Bridport, by the workmen on the estate.

The Aldershot School Board have approved plans of alterations and additions to the West schools, to be carried out at an estimated cost of £1,000.

The death is announced of Mr. William Turner, architect, of Wrexham, at the early age of 42 years. Amongst his works are several churches, chapels, and a number of board schools, and the cemetery chapels at Wrexham.

A cathedral is about to be built by national Russian subscription at Andijan, in memory of Prince Sergius Maximilianovitch, nephew of the Emperor of Russia, who was killed in the late war.

It is stated that Lambeth, Vauxhall, Chelsea, Albert, and Battersea bridges will be opened toll free on March 1st.

An adjourned quarter sessions of the Bedfordshire magistrates was held on Tuesday week to consider tenders for the re-construction and improvement of the Shire hall. Sixteen tenders were received, ranging from £13,030 to £17,699, and the lowest but one, that of Messrs. Wood and Son, of Leeds, was accepted on the recommendation of the architect, Mr. Alfred Waterhouse, A.R.A. The amount of the contract—£13,485—includes fittings for the court-room. The work is to be commenced at once, and to be completed in fifteen months' time.

The floor of the chancel of St. Michael's church, Nottingham, is being laid with encaustic-tile pavement. The work is being executed by Mr. Crossley, of Newark. A stained window is about to be placed in the west end of the same church.

An infectious diseases hospital and disinfecting chamber have been erected for the Taunton Town Council, and are now ready for occupation. The work has been carried out by Mr. Westcombe, contractor, under the supervision of Mr. J. H. Smith, borough surveyor.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. Paper by H. J. Castle, sen., on "Contributive Value," 8 p.m.

Society of Arts. Cantor Lecture No. 1, Dr. Cortfield on "Household Sanitary Arrangements," 8 p.m.

WEDNESDAY.—British Archaeological Association. Papers by Rev. C. Collier, on "The Recently Discovered Roman Villa at Iken Abbas," and by George Patrick, on "Burleigh House," 8 p.m.

Society of Arts. Paper by J. L. Haddon, ex-Chief Engineer in the Ottoman Service, on "Turkish Resources and their Ready Development," 8 p.m.

THURSDAY.—Society for the Fine Arts. Conversazione.

FRIDAY.—Institution of Civil Engineers. Paper by Percy W. Britton, Esq., on "The Design and Construction of Wrought Iron Tied Arches," 7 p.m.

HELLIWELL'S Patented NEW SYSTEM OF AIR&WATER-TIGHT IMPERISHABLE GLAZING. All Woodwork is covered, and no outside Painting is required. Old Roofs Re-glazed. Any one can repair or take in pieces.

"It is suitable for Railway Stations, Mills, Weaving Sheds, &c., but is specially applicable to Conservatories, Plant Houses, and Orchard Houses, and we should be very much inclined to try the system. It is certainly worth looking to."—*Builder*.

"And will, in our opinion, supersede any other similar system before the public."—*Building News*.

"It seems to meet the end in view more nearly than anything we have seen yet."—*The Field*.

"The patent has given high satisfaction to every one using it."—*The Christian Union*.

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For Estimates, Drawings, or Particulars, apply to the Patentee, T. W. HELLIWELL, Brighouse, Yorkshire; or, 19, Parliament-street, London.

WHITLAND ABBEY GREEN SLATES

These SLATES are of a grey green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[Advrt.]

Holloway's Ointment and Pills.—All ulcerations, sores, abscesses, bad legs, and skin diseases are best treated by these medicaments. The ointment eradicates all noxious taints and makes every symptom assume a milder form, and this desirable result is made doubly certain by the purifying, regulating power of the pills.

HIGH-CLASS VARNISHES.

READE BROTHERS, Tower Varnish Works, Wolverhampton, respectfully invite attention to their Varnishes for House Painters, Decorators, and Builders, which will be found of uniform excellence, and for elasticity, lustre, and durability all that can be desired. They would direct special attention to their Extra Hard-Drying Varnishes for church seats, and seats of schools and public buildings, which for hard-drying, brilliancy, and wear are unsurpassed.

Doubling Freestone and Ham Hill Stone of best quality. Prices, delivered at any part of the United Kingdom, given on application to CHARLES TRASK,

Norton-sub-Hamdon, Ilminster, Somerset.
Agent: Mr. E. CRICKMAY, 4, Agar-street, London, W.C.

Trade News.**WAGES MOVEMENT.**

BANGOR.—The bricklayers and masons employed at Bangor struck on Monday, owing to the masters' demand for an extension of working hours until four o'clock on Saturday afternoon.

BOLTON.—The Master Builders' Association of Bolton have given notice of the following great reductions in the building trade:—Bricklayers, plasterers, plumbers, and painters with labourers, will be reduced, bricklayers, 3d. per hour; labourers, 2s. per week; plasterers, 3s. 8d. per week; labourers, 3s. 9d. Plumbers who worked 48½ hours all the year round at 35s. weekly will be required to work 52 hours in summer and 47 in winter, at wages of 34s. 8d. summer and 31s. 4d. winter; and painters will be reduced from 8d. to 7d. per hour. The joiners submitted to a reduction some months ago.

BLACKBURN.—The master painters of this town have issued notices for the further reduction of the wages of operative painters at the rate of 3d. per hour, equivalent to 2s. 3d. per week, to take effect on Monday next. The hands have proposed arbitration, but this has been declined by the employers. It is not expected that the dispute will end in a strike.

DURHAM.—On Saturday week the Durham joiners struck work against a reduction in their wages of 3d. per hour. The men were receiving 73d. per hour, but the building trade is so depressed that the masters allege they cannot compete with contractors at the existing rate of wages. A compromise was offered by the deputation of workmen to continue work at a reduction of 3d. per hour. This the masters refused, and after a long and animated meeting of the men, it was unanimously resolved to stand out against the full reduction.

GLASGOW.—About 250 plumbers in Glasgow, who have been on strike for six weeks, agreed on Monday to accept a reduction of 1d. per hour on the present rate, 83d. per hour.

PRESTON.—The Preston stonemasons resumed work on Monday morning on the masters' terms, a reduction of 4s. per week within a fraction.

SOUTHPORT.—On Monday week the Southport painters came out on strike to resist a reduction in their wages of 12½ per cent. The men had offered to refer the dispute to arbitration, but the masters declined. At present painting is just beginning to be brisk, and the strike will interfere with contract work.

TODMORDEN.—Wages have been generally reduced in the building trades of this town by 3d. per hour. A strike has occurred at Mr. Mallison's, builder, of Vale Mill, who put up a notice of a reduction of 1d. per hour.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

TENDERS.

BRECKENRIDGE.—Stabling at Wild's Rents, Bernondsey, for Mr. C. Morgan. Mr. J. Leaning, architect:—
 Ryder £3,423
 Patrick 3,023
 Tongue 2,884
 Tarrant and Sons (accepted) 2,653
 Greenwood and Sons 2,646
 Sheppard 2,625

BRIDGEMOUTH.—For repairs to the grammar school for the Bridgmouth Town Council:—
 Bates and Head (accepted) £48 7 -
BRIGHTON.—For the construction of the Hornington sewer for the Town Council:—
 Jotter (accepted) £1,253
 [Six tenders received.]

BLACKBURN.—For the sewerage of the districts of Wotton and Livesey for the Blackburn Town Council:—
 Read, G. and J. E. (accepted).

BEDFORD.—For the reconstruction of the Shire Hall, in Bedford, for the Bedfordshire county magistrates. Mr. Alfred Waterhouse, A.R.A., architect:—
 Wood and Son, of Leeds (accepted) £13,485
 [Sixteen tenders received, of which the highest was £17,690, and the lowest £13,030.]

CAMBERWELL, S.E.—For the enlargement of the boys' and girls' departments of the Camberwell-road school, by 300 places, for the London School Board. Mr. E. R. Robson, architect to the board:—
 W. Brass £3,769
 J. Tyerman 3,600
 B. E. Nightingale 3,580
 W. Tongue 3,580
 S. J. Jerrard 3,383
 J. Thompson 3,380
 Wall, Bros. 3,375
 W. Downs 3,333
 Higgs & Hill (accepted) 3,290

[Cost per head of enlargement only, £92s. 9d. Cost per head of entire school (as far as ascertained), £11 11s. 2d.]

CLIFTONVILLE.—Tenders for an additional story to the Sussex Hotel, Cliftonville, Brighton. Mr. Fred W. Hyde, architect; quantities supplied:—
 Cheesman £1,489
 Lockyer 1,447
 Garrett 1,380
 Botting 1,300
 Parsons and Son 1,275
 Hatching and Son 1,185

CROYDON.—For repairs and decorations at Haling Park, Croydon, for Mr. James Watney. Mr. H. J. Newton, architect:—
 Grimwood and Sons £845
 Godden 813
 Lambie (accepted) 793

DERBY.—For founding and erecting a water wheel at Souter's corn mill, for the Derby Corporation:—
 Lampitt and Co. (accepted) £900

FARNHAM, SURREY.—For paving crossings at the foot of Castle-street, Ashley-terrace, and at the railway station:—
 Diamond £105
 Mosher, G. 103
 Duke & Fowler (accepted) 101 10s.

HOLBOAN.—For dusting and watering during the current year for the Holborn District Board of Works:—
 Jackson and Son, Hornsey £3,500
 Hobbs, T., Paddington 3,200
 Dodd, H. 2,650
 Williamson, W. T., King's-cross Wharf 2,774
 Irons, W., Dulston (accepted) 2,490

LOOE.—For the erection of a schoolmaster's house, for the School Board for Looe, Cornwall:—
 Honey, J. (accepted) £322
 Lowest of seven tenders received, of which the highest was £450.]

LLANDDOGET.—For the erection of a schoolmaster's house at Llanddodget, for the Rev. Thomas Jones. Mr. W. E. Jones, architect, Bryn Llanwrst:—
 Jones, Jeremiah £320
 Jones, John 250
 Jones, John Berth (accepted) 270
 Williams, Evan 270
 Griffith, Wm. 260
 Hughes, Wm. 268

LLANWRST.—For the erection of two cottages in Watling-street, Llanwrst, for Mr. William Owen. Bodunig Cottage, Llanwrst. Mr. W. E. Jones, architect, Bryn Llanwrst:—
 Jones, Jeremiah £218
 Jones, David 190
 Griffiths and Edwards (accepted) 200
 Williams, Evan 205
 Williams, Robert 203 10 0

LEA.—Tenders for restoration of north aisle, St. Giles's Church, Lea, Malmesbury. Mr. C. J. Phipps F.S.A., of London, architect:—
 Light and Smith, Chippenham £1,830
 Wall and Hook, Brinscombe 1,726
 Restall, Bisley 1,702
 Stratton and Knapp Garsdon (accepted) 1,500
 F. Brown, Tethury 1,375

MAIDEN HEAD, BERKS.—Residence for P. S. Langton Esq., Norfolk-park. Messrs. Brown and Albury, architects, Reading:—
 Kempell £2,625
 Flewood 2,525
 Simmonds 2,494
 Silver and Son 2,464
 Woodbridge Bros. 2,280
 Kingerlee (accepted) 2,150

MARYBOROUGH.—For repairs and decorations to the Town Hall, for the Town Commissioners:—
 Haynes (accepted) £275 10s.
 [Three tenders received.]

NEW CROSS.—For new kitchen, &c., at the Amersham Arms, New Cross-road, for Mr. W. Agate. Mr. W. T. Hunt, jun., surveyor:—
 D. Thomas £270
 M. Redman 248
 H. L. Holloway 230
 R. Smith (accepted) 198

PENOE, S.E.—For gas fittings in the new parochial offices, for the Penze vestry. Mr. Elkington, architect:—
 Stude & Co. (accepted) £91 12s. 6d

RED HILL.—For the erection of shop and dwelling-house and two cottages in Commercial-road, Red Hill:—
 Apter Bros. £865 0 0
 Worsford 823 16 0
 Stoneman and Son 720 0 0
 Seougal, T. (accepted) 665 16 0

ROTHERMERE.—For paving Laxford-street, for the Rotherhithe vestry:—
 Rutty £220
 Turner, T. 188 10s.
 Etheridge, W. 184
 Kent, C. (accepted) 178
 Wells & Barnes 155 10s.

SOUTHEAST-ON-SEA, ESSEX.—For constructing sewers in Porter's town for the Southeast-on-Sea Local Board. Mr. Harrington, surveyor:—
 Maxwell, W. £1,200
 Day, C. R. 1,198
 Storey & Co. 1,136
 Bell, J. 962
 Bulford, G. 879
 Whurr, T. 705
 Strachan, J. 610
 Steward, W. 598 10 8
 Spenderlow, W. (accepted) 540

TOOTING.—Tenders for the erection of the Defoe Memorial Manse, at Tooting. Messrs. Tarring and Wilkinson, architects, 69, Basinghall-street, London, E.C.
 Gough, London £905
 Atkinson, Wandsworth 795
 Manley, M., London 787
 Langridge and Sons, London 750
 Lovell, E., London 750
 Castle, W. and H., London 721
 Lawrence, T., Mitcham 715
 Morris, D., Tooting 700
 Behington, Uxbridge 690

TOTTENHAM.—For constructing a new sewer in West-green-road, for the Tottenham Local Board of Health:—
 Bell, Wood-green £458
 Bloomfield, Tottenham 450
 King, Herne-hill, and Humphreys, Tottenham 385
 Rowley, West-green 355
 Pizze, Crouch-end 345 10 10
 Ford and Norris, Wood-green (accepted) 340

WOOD GREEN.—For the construction of roads, sewers, and surface-water drains, on the British Land Company's Estate, at Wood Green. Mr. Henry B. Mitchell, Surveyor:—
 Koehle £2,756
 Jackson 2,696
 Acock 2,657
 Harris 2,655
 Crockett 2,625
 Killingback 2,580
 Pizzezy 2,550
 Dunmore (accepted) 2,491
 Richardson (withdrawn) 2,200

WALSALL.—For new receiving wards and alterations to the union workhouse for the Walsall Poor Law Guardians:—
 Taylor, Thomas (accepted) £720

[Lowest of thirteen tenders received, of which the highest was £932; architect's estimate, £790.]

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THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 21, 1879.

NEW RENAISSANCE BUILDINGS.

THE inclination of the last new fashion in building is by no means exclusively towards the Stuart or Jacobean style, if we may judge by recent works in the metropolis. If we walk down the Embankment, up Northumberland-avenue, to Charing-cross, we meet with three buildings, all executed in some version of the Renaissance, though illustrating very different schools. Taking Mr. J. P. St. Aubyn's and Professor E. M. Barry's new block of chambers in the Temple, we are struck by the fact that two gentlemen of totally opposite schools are engaged jointly in the work. The design by the first-named gentleman was Gothic, a view of which we gave some time ago; but the erected façade towards the Embankment is French Renaissance, and is the work, we believe, chiefly of Professor E. M. Barry. The connection of the two gentlemen is not difficult of explanation. The new block is an extension of the Harcourt and Plowden buildings, and Mr. J. P. St. Aubyn has acted for the Middle Temple, and Mr. E. M. Barry for the Inner Temple, or Harcourt structure. It being necessary to make one elevation, it was determined to adopt the design of Professor Barry, and the result is a structure of Renaissance character, in which the Gothic element of variety has been mainly kept in view. Indeed, there is much in the outline and massing of the present building which reminds us of Mr. J. P. St. Aubyn's first sketch. The broken frontage and the agreeable contour and skyline are essentially Gothic. The angle turrets are not capricious features, but intended to give a certain æsthetic result, arising out of an accidental circumstance of plan, and those who are still fond of asserting that Classic design cannot be made picturesque in its masses, need only to look at this building to see what is possible, even in London, when there is plenty of room, and when the restrictions of the Metropolitan Board do not unnecessarily interfere. We may mention that a necessity became, perhaps, a virtue in this respect. The Board refused to allow the frontage to go beyond the old river wall, and to save a wasteful setting-back of the line of front, the façade forms an acute angle with the return on the eastern side, and a slightly obtuse one on the west. To conceal the effect of the perspective lines, angle turrets were introduced, and the result must be pronounced satisfactory. One great advantage certainly the architects here have had, and that is the building can be seen in the front and at both ends—an opportunity seldom to be met with in London. The end façades have also bay windows, and that towards the gardens facing Blackfriars is flanked by a circular turret in the line of the older buildings which serves to mark the limit of the façade on this front. The main façade is symmetrical; it has a slight projection in the centre crowned by an ornamental gable in the style of the French châteaux of the time of Francis I., on either side is a spacious bay window, each of these being marked by lofty gables which break the steep mansard roof. The only fear we have is that the smoky atmosphere of London will not take kindly to the fine carved panelling and detail, which in parts begin to look smothered in black. The corner turrets, with their ogee roofs and crocketed angles, are made useful features in the plan, and they finish above the cornice as open peristyles. Examining the building, we

find it comprises two distinct wings or extensions parallel to each other and separated by a court. The wings are united in front, and make one façade. This is done by a centre archway in the façade leading into the court, above which are large rooms alternately approached from the Harcourt and Plowden wings. Each wing contains several sets of chambers to be exclusively used for the members; and each set consists of four or more rooms, a laundress closet, water-closet, and safe. On the Middle Temple side there are two sets of chambers on each floor, making on all the floors fourteen sets. The Inner Temple wing consists of three sets on a floor, in all twenty-one sets. We notice a little ingenuity has been exercised in the planning of the rooms near the front on account of the unsquareness of the site. A few of the larger rooms with bay windows are turned into octagons in plan, and the passages are rather crooked. On the Harcourt side two open wells give light to some of the inner rooms, and in one or two instances the lighting is indirect and insufficient, though the staircases are all lined with glazed bricks. The stairs are of stone, and are lighted from the centre court. The floors are constructed on the Dennett arch system, and the principal sanitary arrangements have been carried out by Mr. Jennings. In the Middle Temple chambers Mr. Jennings' plan of ventilation has been adopted, we are told, successfully. It consists of air-chambered flues opening into the rooms. Dust shafts are also provided to the floors, and every convenience seems to have been consulted. The façade and its profusion of carved work are the chief attraction, as internally the chambers are plainly finished with plaster for painting. Passing under the centre archway we notice symbolic carved keystone and spandrels, and the piers and window friezes are enriched with carved medallions. Over gateway forming the central line of mullion of façade are figures representing Valour, Truth, and Clemency, and at the sides are symbolic carvings of Moses as the Moral Law-giver, the Queen as Modern Law, and Minerva at the top. Panels of the Virtues, the Sciences, Commerce, and Navigation are also introduced. On each side of the entrance arch niches are left for figures of "Justice" and "Learning," which are being executed, we hear, by Mr. Calder Marshall, R.A. The other carving is very spirited. We may add that the clerk of works is Mr. Geo. Goodchild, to whom we are indebted for some particulars, and that the contract was taken by Mr. G. W. Booth. By adopting the Renaissance of the early period, the architects have overcome the rigid forms and inelastic features of a purer Classical style, and have made their building harmonise with the Temple Gardens and picturesque masses of brick houses. The formality of the Roman or Palladian would have been out of place, the Gothic would have blended incoherently with the library of Mr. Hardwick, and the "Queen Anne," though akin to the old hall and a few of the houses, would have appeared somewhat incongruous with a spacious thoroughfare so thoroughly modern in its conception as the Embankment. The type of Renaissance chosen is eminently Gothic in its spirit and outline, and the architects appear to have taken as their model the Chateau de Chambord, in which we trace many of the details employed. The horizontal lines are emphasised, but the vertical lines are not lost. The carved and panelled pilasters which flank the windows are made to play a subordinate part, being purely decorative, while the balcony of the first floor is made a prominent line and is deeply and massively corbelled. The basement is rusticated and has a batter at the angles. One of the best features is the cornice and the dormers, the profuse carving and members of which produce a very rich, though not redundant effect.

In Mr. Gibson's offices for the Society for the Promotion of Christian Knowledge a more Classical mode of treating the façade is adopted, and it is only fair to observe that here the limitations of site imposed a rigid line of frontage. But the author, notwithstanding, has been fortunate in giving variety to the fenestration and ordinances by adopting a single order for the two principal stories, and in otherwise diversifying the windows. Instead of superposing four or five orders with their entablatures answering to the number of stories, a very common mode of applying the Classical style, the elevation is divided into three—a basement of one order comprising the chief offices, a predominant order, and an attic. This is by no means new; the principle was largely employed by the architects of the time of the earlier Georges—cleverly in Somerset House; but it became rather hackneyed, as we find it in some of Nash's buildings in Regent-street, Eaton-square, and many of the neighbouring squares. The monotony of the practice arose from masking a common brick front with commonplace windows, behind a screen of three-quarter columns or pilasters, above which the front, in all its naked baldness, peered as an attic story. Mr. Gibson has avoided this appearance by recessing some of the planes of his walls, and in producing a play of light and shadow. There is certainly a freedom in the detail; the usual cornice members to the basement story, which is rusticated, are dispensed with, and bands of guilloché run round the broad faces. The treatment of the attic in the main façades is satisfactory, giving variety in a part of the building that is generally spiritless and lacks interest, and the architect introduces in the cornice a peculiar though somewhat favourite means of relief by a diaper in the cove. On the whole, the corner frontage has been dealt with in a masterly manner, though some exception may be taken to the enrichments.

We have already noticed the architectural treatment of the Grand Hotel, in which a very different working out of the Classic régime is observed.

REMBRANDT'S ETCHINGS.*

COLLECTORS of Rembrandt's etchings, especially in England, have much cause for thankfulness to Mr. C. H. Middleton for his excellent and comprehensive catalogue of the works of the greatest master of the Dutch school. The life of Rembrandt Van Rhyen has been much obscured by the many misstatements of those who have written about him: most of the stories told to his discredit have been proved to be fictitious. He was born of respectable parents in easy circumstances, in the year 1607, as is proved by the register of his marriage, which took place upon the 22nd of June, 1634, when he calls himself twenty-six years of age, as his birthday was on the 15th of July. Having no turn for classical studies, he was taken from school at an early age, and placed with a painter to learn the principles of the art. Having been instructed further by Jacob I. van Swanenburgh and Lastman, he studied at last, according to Houbraken, under Jacob Pinas, but this fact requires corroboration. Having already achieved considerable success, in 1630 he settled at Amsterdam. Here he married his first wife, Saskia, the daughter of Rombertus Van Ulenburg. In or about 1640—possibly in expectation of a sum of money upon the death of his mother—he purchased a house situated in the Sint Antonie Breedstraat, and in it executed most of his finest works.

Mr. Middleton thinks it not unlikely that the purchase of this house was the first cause of the ruin that overtook the artist in

* A Descriptive Catalogue of the Etched Work of Rembrandt Van Rhyen. By CHARLES H. MIDDLETON. London: John Murray, 1878.

1637. It is of great importance that we do not confound this house with a smaller one which he occupied previously. It was of this larger one that the story is told of his having so large a number of pupils constantly paying him 100 florins a year, the upper rooms of it being divided into small chambers by screens so that the pupils might be kept separate. In 1642, his charming wife, of whom he made so many portraits, died, and from this date a perceptible change takes place in all his work; but notwithstanding the graver tone which is apparent, he still worked on as hard as ever, or harder still. In 1653 he married again, and, becoming deeper and deeper in debt, in 1658 he was made a bankrupt, and all his splendid collection of prints, pictures, and drawings, of armour, of dresses, and rare china was dispersed. The house was stripped of everything, mention having been made of even the half-dozen linen articles at the washerwoman's. From this time the history of the artist becomes obscure. We find that about 1665 he was again a widower and again married. Whether he, as report says, ever went to Sweden or England is uncertain. Evidence goes far to prove that he never left the town in which so much of his life had been spent. He died at Amsterdam in October, 1669, and was buried at the Westerkerk. The arrangement of his etchings is new, and should commend itself to all students. The fact of the great variety of the quality of work exhibited in different examples of the master's etchings suggested to the author that it would be best to rearrange the whole of the etchings according to the dates of execution, so that the student might understand easily that works of apparently different hands were really by the same hand at different periods. In these days of reckless scepticism, when it has become the fashion for so-called connoisseurs to show their acuteness, by their supposed discoveries of alien work in so many of the earlier and larger etchings, this arrangement will prove very instructive. To prevent confusion and difficulty of reference, a full table of all the etching-work of Rembrandt, in the order of date of execution is prefixed to the volume, the numbers of the five principal catalogues being placed in columns opposite.

The descriptive catalogue is arranged in three parts: (1) Studies and Portraits; (2) Scriptural and Religious; (3) Fancy Compositions; each preceded by a list of the works included in the section. After the description of each print we have accurate measurements in inches and millimeters; the various states (not always allowing trifling alterations to determine a different state); and the principal old copies that could by any means mislead the unwary. Reference is made in each example to the public collections in which it may be found, and, in cases where it has been thought advantageous, critical notes upon technical, controversial, or other matters of interest are added.

Mr. Middleton goes very fully into the question of Rembrandt's making money out of etchings, done by pupils, and inscribed by himself, and as to how far he was legitimately assisted. He proves conclusively that the early etchings, when he was probably almost without pupils, and before he had great reputation, could have brought him little profit. "It has been constantly and confidently asserted," says Mr. Middleton, "that Rembrandt continually altered his plates, working up and producing new states, the charge being usually combined with an accusation of avarice and dishonesty. . . . But the conclusion at which I have arrived is in entire contradiction to this usually-received opinion. Rembrandt very rarely altered his plates; when he did so it was solely for an artistic or other such intent—he corrected an obvious error, supplied an unintentional omission, or added that which

he knew was an almost necessary improvement. Alteration for the mere sake of alteration; still more alteration through greed of profit, was entirely foreign to his habit, and wherever a change is effected which does not recommend itself to us, and is unworthy of his genius, I do not hesitate to affirm that an inferior hand has wrought upon his plate."

Without always agreeing with Mr. Middleton in the instances he brings, there is no doubt that he is usually a safe guide. The variations which disfigure Rembrandt's later prints were doubtless made by others into whose hands the plates fell after his misfortunes. There is little chance that he was allowed to retain his valuable copper-plates when they took from him the linen which was at the wash. The book concludes with a list of the works consulted and an ample index. There are twelve plates, of great value, of tests by which to discover the various states and copies. No collector will be without a copy of this valuable book, which is alike creditable to the writer and the publisher. Nothing has been spared to do justice to the importance of the subject.

ARCHITECTURAL GEOLOGY.—IV.

POIKILITIC series. This name has been given to the strata which come between the Oolites and Lias and the Carboniferous rocks, on account of the *variegated* colours, which are their distinctive feature; they consist chiefly of red clays, shale, and sandstone in the upper part, with beds of limestone and dolomite, or magnesian limestone, below them, the upper beds being called "Trias" or "New Red Sandstone and Marl," and the lower beds the "Permian," or more commonly the "Dolomitic," after the French geologist, Dolomieu. The Poikilitic series may, therefore, be considered as forming the boundary between the Secondary and Primary rocks, since the Trias belongs to the former and the Permian to the latter division.

Triassic rocks present a remarkable contrast to those of the Lias, both in the red colour which prevails in most of the beds and the small amount of organic remains and carbonate of lime found in them; consequently it is hardly correct to apply to any of them the term "marl," which signifies a calcareous clay; but as the name of "Red Marl" has been commonly given to the upper beds of the Trias, it will be necessary to retain that designation in distinguishing them from the lower beds, which have received the name of "New Red Sandstone." The Trias beds come prominently to the surface in the counties of Cumberland and Northumberland, West Lancashire, and Cheshire, the north-eastern parts of Yorkshire, and over a large portion of Nottingham, Warwick and Worcester; also in the counties of Stafford, Leicester, Derby, Gloucester, Salop, Glamorgan, with small portions of Somerset and Devon.

New Red Marl consists chiefly of red clay with beds of alabaster and gypsum, and occasionally sandstones. It is found near Whitehaven, in Cumberland, where alabaster is obtained both for ornamental purposes and for the manufacture of plaster of Paris. In Derbyshire its beds yield large quantities of alabaster frequently termed "Derbyshire spar" or "marble," which is much used for decoration of churches, as it is beautifully veined and takes a good polish, quarries of it being worked at Aston and Chellaston near Derby; while at Barlborough, near Chesterfield, the clay is used for brick-making. In Leicestershire alabaster is also obtained near Syston, and sandstone for building in the neighbourhood of Leicester. In Staffordshire we find alabaster at Tutbury, near Burton-on-Trent; and in Notts it occurs in abundance in the neighbourhood of Newark, Orston, and Axholme; while in the same

county the red marl clay is worked for red brick, tiles, and drain-pipes about Nottingham and Beaston. Blue bricks are made from these beds at Nuneaton and Polesworth in Warwickshire, red bricks and tiles near Coventry and Leamington. At Great Malvern, in Worcestershire, it is worked for bricks, tiles, and drain-pipes, and also in some parts of Somerset, as at Farringdon, near Bath; Canton, near Taunton; and Poole, near Wellington. In Cheshire the red marl is largely quarried for sandstone at Ombersley and Hadley, and for burning into lime at Pattingham and Tattenhall.

New Red Sandstone supplies a large amount of building stone in Northumberland, Cumberland, Yorkshire, Lancashire, Cheshire, Derby, and the Midland Counties, as well as in parts of Gloucester, Somerset, and Devon. In Northumberland it is quarried at Deans, near Newcastle; in Cumberland near St. Bees' Head and Whitehaven, as well as in the neighbourhood of Carlisle, for building purposes; flags and landing being obtained at Lazonby. In Yorkshire a sandstone having dark brown quartz grains, with argillo-siliceous cement, is quarried at Os-motherly, near Northallerton, and at Stockton-on-Tees and Cottingham, near York; also at Gatherly Moor, near Richmond, a similar stone is obtained, weighing 136lb. to the foot cube, which has been much used for buildings in Richmond and Darlington; flags and paving-stones are obtained in the south-west of Yorkshire, near Rotherham and Bradford. In Lancashire a reddish-brown pebbly sandstone is quarried in the vicinity of Liverpool, at Ramhill, Eccleston, near St. Helens, and Rainhill; building stone is also obtained at Preston, Kirby, and Barrow-in-Furness. There are numerous quarries of this stone in Cheshire, at Alderley, Birkenhead, Chester, Frodsham, Kelsall, Macclesfield, Malpas, Neston, and Runcorn. In Derby it is worked at Ashby and Weston-on-Trent. In the counties of Stafford and Warwick we find good building stone near Wolverhampton, Cheadle, Brewood, Codsall, Rugeley, Stafford, Tamworth, and Penkridge.

A white sandstone which has been much used in buildings about Shrewsbury is quarried at Belton, near Drayton, in Salop, and also at Bowdley is a similar stone, which is used in buildings at Ludlow and its neighbourhood. At Bishop's Castle a sandstone is worked for local buildings, and at Bridgenorth flagstones are quarried. In Gloucester a good building stone is found near Cheltenham, and a red sandstone is quarried at Wootton, near Garston. At Ashby-de-la-Zouch, in Leicester, and at Warwick, Leamington, and Polesworth, in Lancashire, a freestone is obtained from this formation, and much used in local buildings. Near Bristol a sandstone is obtained at Easton, and a freestone at Clifton, which has been used in the suspension bridge; a shelly limestone is found at Hamhill, near Bridgewater, and there are also stone quarries at Trull and West Leigh, near Taunton. In Devon it is quarried for building stone at Exminster, Heavitree, and Pakcham; and for hearths and flags at Thorverton.

The beds of clay which occur in many parts of the Red Sandstone formation are largely worked in Warwickshire, at Ansley, Chilvers Coton, and Nettlefold, near Nuneaton, for the manufacture of blue bricks and tiles. In Worcester there are brick works at Ordingley, near Droitwich, and fire-bricks are made from it at the Stoke Works; at Malvern it is used for tiles and drain-pipes. In Stafford red and blue bricks, paving and drain-tiles are made at Winsill, near Burton-on-Trent, from this clay. In Cheshire it is worked for ordinary bricks at Runcorn, Stockport, and Wrexham, and for fire-bricks near Macclesfield.

Permian strata, or "Dolomites" underlie the New Red Sandstone geologically, the beds

greatly resembling those of the Trias, with the exception of the magnesian limestone, which is absent in the upper rocks, but is abundant in the lower; their general characteristics being red sandstone and marl, magnesian limestone, marl slate, and conglomerate. They are found near the surface along an almost unbroken line of country, reaching from the mouth of the Tees, in Yorkshire, to that of the Exe, in Devon, with a branch in a north-westerly direction to the mouth of the Mersey. The prevalent red colour in these rocks is indicated by the names of several places in which they abound, as Rotherham, Retford, Radford, Redcliffe, Radstock, &c.

Red sandstone and marl of the Permian series are found westward of Doncaster, also at St. Bees' Head and Corby Castle, in Cumberland, Furness Abbey having been built from the stone quarried at St. Bees' Head. Near Manchester there are beds of red marl, clay and sandstone, with bands of limestone, the thickness being 140ft. In the Lake district these beds attain a thickness of 4,000ft. near Appleby, and of 8,000ft. at Penrith. In Durham there are beds 700ft. thick of marls containing gypsum, beds of limestone, marl slate, and sandstone, at Thiekley, Ferryhill, and Durham, the Lower Red Sandstone being found at Clacksheugh. In Yorkshire the Lower Red Sandstone appears near Knaresborough and Pontefract, in Lancashire at Astley, and in Cumberland at Penrith. It extends westward from Wolverhampton, in Stafford, to Coalbrookdale, in Salop, is found on the south of Shrewsbury and on the borders of the Dudley coal-field. In South Stafford the beds reach a thickness of 3,000, and in North Stafford of 700ft. Beds of sandstone are quarried near the town of Stafford. In Warwick a sandstone for local buildings is obtained at Baxterley, near Atherstone.

Magnesian Limestone or *Dolomite* is the most important feature in the Permian series from the architect's point of view, that material having been selected for the external facing of the Houses of Parliament at Westminster, the Geological Museum in Jernyn-street, and many other important buildings, on account of its uniformity of texture and colour, which render it peculiarly suitable for architectural work. In this country the Dolomite comes to the surface over a very limited area, a narrow strip of it forming the eastern boundary of the Durham and Yorkshire coal-fields. The northernmost outcrop is at Tynemouth, from whence it extends southward along the coast to Hartlepool, and then turns inland towards Bishops Auckland and Darlington. In Yorkshire the Dolomite extends in a narrow belt from Bedale in the north, by Ripon, Knaresborough, Tadcaster, Pontefract, and Doncaster, going southward through Notts, by Worksop and Mansfield, as far as Nottingham.

In Durham the stone is quarried for building purposes at South Shields, Boldon, Fulwell near Sunderland, Trimdon, Coxhoe, Ferryhill, Midridge near Shildon, Aycliffe, and other places. The most important quarries, however, are those which are worked in Yorkshire, Nottingham, and Derby, in the narrow strip cropping out between Tadcaster on the north and Mansfield on the south, where the stone which is found consists, with few exceptions, almost entirely of the carbonates of lime and magnesia. The purest of these is that obtained at Robin Hood's well, near Doncaster, which is of a cream colour, and partly crystalline, its composition being $41\frac{1}{2}$ per cent. of magnesia to $55\frac{1}{2}$ of lime, without any trace of silica. Its weight is 137lb. per cubic foot. The stone found in Roche Abbey, between Rotherham and Bawtry, is of a similar description, having $39\frac{1}{2}$ per cent. of magnesia to $57\frac{1}{2}$ of lime, with less than 1 per cent. of silica, and cubic foot weighs 139lb. It has been much

used in building the churches of that locality. The stone quarried at Anston, between Worksop and Rotherham, has been largely used for building, and together with that of Bolsover-moor in Derby, was employed for the outside of the Houses of Parliament and the Geological Museum. The weight of Anston stone is 144lb., and of Bolsover 151lb. per cubic foot. The composition is very similar in all the stone in this locality, being from $42\frac{1}{2}$ to 45 per cent. of magnesia with from 51 to 53 per cent. of lime, and a small proportion of silica. A similar stone is found at Huddlesstone, near Pontefract, the weight of which is 137lb. per cubic foot. This has been largely used for building purposes in Yorkshire, as at York Minster, Selby Castle, Sherburn Church, and also in London at Westminster Hall, and Henry VIIIth's Chapel. A soft magnesian limestone is obtained at Brodsworth, near Doncaster, which was used in old Doncaster church, but is not durable. Its weight is 133lb. to the cubic foot. The stone of Cadeby, near Doncaster, has also been used in London, but perishes rapidly. Its weight is only 126 $\frac{1}{2}$ lb. to the foot; but at Conisborough, in the same locality, a good and durable stone can be obtained, and was formerly much used in that neighbourhood. The stone found on Bramham Moor, near Tadcaster, at the quarries of Jackdaw Craig and Smawse, has been long used for buildings in that part of Yorkshire, as at the churches of York, Tadcaster, Beverley, Hull, and Ripon. In most cases, however, it shows signs of decay. The weight of these stones is 128lb. to the foot.

In the neighbourhood of Mansfield, Notts, we find a dolomite which contains about 50 per cent. of silica, the lime and magnesia acting as a cement for holding the siliceous particles together. The stone of Mansfield is largely used and much esteemed for architectural purposes on account of its colour, durability, and fineness of texture. The white stone contains only 7 per cent. of magnesia, add weighs 146lb per cubic foot, while the red contains 16 per cent. of magnesia, and weighs 148lb. per cubic foot.

A hard and compact sandstone belonging to this formation is also largely quarried at Elland Edge, near Halifax, chiefly for walling and paving stones. Its weight is 153lb. to the cubic foot. The dolomite found near Castleford, Leeds, Knottingley, Milford, Selby, and many other places, is used for burning into lime.

ART STUDY AND ART WORKERS.

AT the recent annual meeting of the Nottingham School of Art, the head master—Mr. J. S. Rawle, to whose efforts the school owes its present enviable position, gave a very sensible address to the assembled students. He said if

"A thing of beauty is a joy for ever" it should also be a joy for everyone. No student should imagine that the things which specially interested those of different occupations to his were therefore of no interest likewise to himself. What he meant was this, those who were ornamentists should seek all the good, and learn all they possibly could from the pictures, and those who were artist students should not think that ornamental art was beneath their notice. The followers of each branch of art might learn much from each other's work. For there was not that wide gulf between the work of the ornamentists and of the artist which many so erroneously supposed. The same broad principles, the same great truths, should guide both. There was not one art for the designer and another art for the picture maker. In a picture the mode by which the beauty of line and of form were produced was not so evident, for pictorial art should disguise the means by which the end was gained; whereas in an ornamental design they might, without restraint, show more completely those lines and subordinate masses which led up to the principal forms. If they critically analysed a good picture and a good piece of ornamental work they would find that

the same guiding principles, in a greater or a less degree, had influenced the construction of each. And experience proved that the greater the art power possessed by the designer the better would be his work. It was also true that a knowledge of ornamental design would prove a help to the artist. This should always be felt, and then, although pictorial art was, of course, the higher development, there would be a greater bond of sympathy between the two, which would prove of benefit to both. Ornamental art should be considered as the younger sister to pictorial art, and not be, as was often the case, banished out of the family altogether, as something unworthy of association. This union would not degrade the latter, but would certainly elevate and ennoble the former. The workers in each branch of art should remember that all good original work must be based upon what had gone before. If it were not for the influence of the past upon them they would be in the condition of a New Zealander, who, without a history to build his experience upon, could only carry his primitive art-power as far as the carving of rude simple forms upon the prow of his canoe. If they looked back upon the past epochs of art, both ornamental and pictorial, they found, in every case, that there had been a gradual growth which in time only, through a succession of workers, had brought about some distinctive characteristic which marked the art-history of the period. A style in art was never originated solely by one man, but by the united efforts of a succession of men working together with one aim, each taking the excellences, or the peculiarities, of his predecessors as a foundation upon which to build a more complete superstructure. It was difficult sometimes for these who were actually working to note the gradual change that was taking place. It was only by looking back that they were able to mark progress, or the reverse, for art had its periods of decadence as well as its periods of advancement. Future generations would be better able to understand and to appreciate, at its true value, the work that was being done in this the Victorian Age. They might see, by looking back some fifty years, what a great, he felt he might justly say,—what a mighty change had come over the art-practice and general art-feeling in this country, in that period of time. It matters not whether they looked at pictorial or at decorative art. The art of to-day was a different thing to what it was half a century ago. Who was there who would say that ornamental design had not, with them, made gigantic strides in this period of time? Indeed they might only step back a quarter of a century, and see what their own curtains were like then,—when straggling palm trees, with birds and beasts, unknown to natural history, did duty for ornament; when lions or panthers sprawled upon their hearth-rugs, and when patterns, outrageous in form and in colour, disfigured their walls. Let them be thankful that they knew better now. There was now a greater sense of propriety and fitness in construction which guided all their decorative work. There was better form and better colour. And let them rejoice when they knew that they could do this better work themselves, without having to place an ignoble dependence upon outside foreign help. And again, with regard to the Fine Arts; many pictures of fifty years ago, which were then thought worthy of honoured places in the rooms of the Royal Academy would now be rejected from a second or third-rate provincial exhibition. It was doubtful whether they could mark much increase in the number of great men, for genius was a Divine gift which shone out but rarely, and appeared only as God, in his good time, pleased to bless the world with it. Genius might be helped by favourable conditions—it could never be created. The great changes in the past half-century were more to be observed in the rank and file of art-workers. Where there was one man who, fifty years ago, could paint a fairly good picture they found now a score of men and of women who could do far better. There was now a casting aside of worn-out academic rules and mannerisms, and a more direct study of Nature. She became the true source of inspiration—the trammels of formal rules and traditions had been burst asunder, and Nature's laws had come to be considered first, and the canons of Art, afterwards. They saw on all sides more truth and vitality, although they could not shut their eyes to the fact that there were tendencies to be observed, here and there, to run into wrong

grooves which must be watched and guarded against. Art was, comparatively, of recent growth in this country. It had shown its widespread influence in other nations long before it even began to take root in British soil. They could hardly go so far back as Holbein or Vandyck, and say that these men were exponents of English Art, for they were foreigners who came to live with them, importing some of that art-power which, unfortunately, the English did not then possess. It was not until the middle of the last century, that England commenced to show the world that she also could have an art-life of her own; and it was Hogarth, Gainsborough, and, more particularly Reynolds, who may be said to have given birth to the English School of Painting. They burst forth like meteors, out of great darkness, and produced works which were the admiration of all men, and which would stand the test of all time. With them a brighter era dawned; and soon arose the genius of Wilkie, of Etty, and of Müller, to assert that art should indeed have an abiding home in this land. But, perhaps the most wonderful development of all has been the rise and the progress of the English School of Landscape Painting. England stood proudly alone, on an eminence as the birthplace of the modern school of landscape painting. Whatever might be their failings in other branches of art no one would dare to snatch from them the honour of having won unparalleled success in the representation of all that was beautiful and grand in the world of nature surrounding them. It was only in the beginning of the present century that a constellation of geniuses made its appearance, and the works of Constable, Patrick Nasmyth, De Wint, Copley Fielding, David Cox, and Turner, showed the whole world the glories of the meadow, the river-bank, and the mountain side. These men, together with the figure painters before mentioned, had testified to their fellow-men that art, with all its beauty of form and glow of colour, could live in their midst, and take a deep hold of their hearts and minds, notwithstanding their cloudy skies and choking fogs. They must not join, then, with those who so unjustly said that the English were not, and could not, possibly be an artistic nation. (Applause.) They must remember how young their national art-life was, and not close their eyes, wilfully, to the fact, that each decade of years showed signs of an increasing, and of an enduring strength. But, if a yet more glorious future was to be unfolded for them, they must all remember that the humblest workers in the cause of art had their fair and just share of work to do. It was not to the great alone that they must look, but also to the small from whom the great must spring. Those who were students should remember that, insignificant though their powers might then be, they were still part and parcel of the great company of art-workers. They, too, could help towards whatever greatness and glory in art their country had in store for them. They could do this by deeply loving their work—by throwing their whole soul and mind into it with the determination ever uppermost before them—that whatever they had to do must be done honestly and thoroughly, and with a reverent spirit.

PICTURES AND ETCHINGS.

MESSRS. ELLIOTT & FRY, of Baker-street, the well-known photographic artists, have just opened an exhibition of paintings well worth a visit. The works exhibited are chiefly those of an artist who must be acknowledged as one of the most gifted painters we have—we mean Mr. Hubert Herkomer. For power of imagination, and for the faculty of rendering character, few modern artists are his equal; but the most remarkable peculiarity impressed upon us by these works is that Mr. Herkomer can paint both grand and small subjects. He can cover a canvas nearly as large as any Raphael or Rubens ever painted upon, with subjects of surpassing breadth and depth of tone; and he can paint, with exquisite feeling and minuteness of detail, *genre* pictures of cabinet delicacy. We are struck, on looking over the collection of Messrs. Elliott and Fry, with Mr. Herkomer's now almost historical picture, "The Last Muster," made known to the public by the beautiful steel engravings. For accurate drawing and vigour of handling, no less than for *chiaroscuro* and colour, this is one of the finest studies of the

painter. "Rest" is the artist's title for a water-colour representing as a scene Aldenham Church-yard, near Watford. At a second glance we catch the meaning of the designation. An old, wrinkled woman of the allotted span of life, such as the artist alone can depict with such a forcible expression of countenance, is seated under a tree absorbed in meditation and enjoying the quiet and rest of the churchyard. This is certainly executed in the happiest style of the artist. The time-stained church and the exquisite portrayal of the lineaments of the face of the old woman unite to place the picture above the ordinary run of representative subjects. Mr. Herkomer, though he often verges on the "grand" style, does not indulge in ideal portraiture; his countenances are all essentially natural, though never vulgar or trivial. Thus his picture called "Bittgang," a pleasing incident founded on a religious custom of blessing the crops in Bavaria; his study of Mr. Fry's gardener, together with "A Word of Advice," one of his recent productions, "A Souvenir of Rembrandt," and his fine picture, entitled "Who Comes Here?" are marvels of expression. A striking study in water-colours depicts the shooting of a poacher, an episode of hunting life in the Black Forest, which Mr. Herkomer has illustrated with dramatic effect. The picture is small, but the figures, the horror depicted in the countenances of the gamekeeper and hunting party, and the half-revealed fact of the fatal shot in the discovery of the dead man, whose legs only appear in the foreground, render this a wonderful instance of the artist's power in narrating plot. The sequel to this story, called the "Arrest," is perhaps still more clever as a study of countenance and of character. Another incident in the Black Forest, under the name of "A Dilemma," has been wonderfully told by the artist. A tourist and his wife, a newly-married couple, have lost their way, and enter the room of a chalet, in which a group of people sit. The stranger, guide-book in hand, endeavours to make himself understood, but the faces of the bewildered occupants tell too clearly that they are not understood by any, while the faces of a few others betray suspicion of the intruders. Equally telling is another piece in which two women are engaged in gossip. We cannot mistake the air of the two interlocutors, whose very countenances seem bent on tittle-tattle. A long piece, showing a forest of pine with wood-cutters, is perhaps one of the most masterly and finished in this collection, and we believe the artist himself thinks it one of his happiest works. The tree stems are truthful, and the colouring has a depth of tone thoroughly characteristic. In *genre* subjects Mr. Herkomer seems to excel, and we saw a few groups of studies, and figures painted with an exquisite feeling, with an oil-like body of colour. This *impasto* mode of execution seems to be a favourite one, particularly in some of the earlier pieces. The artist works his figures up with a thick body of colour, upon which the lights are placed in opaque pigments. As a masterpiece of grouping and colour, "Who Comes Here," occupies a high place in the collection. The old man's and the little girl's faces eager to know who the stranger is, are marvellous in their truth, expression, and execution. We must not omit to notice some very clever allegorical subjects. One, a "Fairy Symphony," is a composition of a highly poetic kind in which the artist has drawn largely upon his imagination. In this instance there is a wealth of imagery in the sylphs and monsters introduced, and the semi-spectral treatment is very clever. The composition is founded apparently on a mythological legend. The artist's "Fawn Fancies," and symbolic studies of "Morning" and "Evening" are also clever and highly decorative. Those who wish to see some of Mr. Herkomer's choicest works cannot do better than to pay a visit to the collection of Messrs. Elliott and Fry.

Messrs. J. Hogarth and Sons, of Mount-street, Grosvenor-square, have on view a collection of etchings, by Messrs. C. P. and F. Slocombe, of a character that will repay inspection. They chiefly comprise views executed from nature. Those by Mr. C. P. Slocombe represent coast scenery in Cornwall, and other parts, and display a thoroughly artistic conception. In rock scenery, as well as in foliage, Mr. Slocombe is particularly happy, and we may point to "Path through the pine wood," "Chalk cliffs and boulders, Rottingdean, Sussex," "King Arthur's Castle, Tintagel, Cornwall," and "Lyndhurst, New Forest," as particularly expressive pieces in

which the artist's needle has depicted with a great deal of feeling and colour these objects. "Stonehenge, mid-day," is a fine etching, and Mr. Slocombe's handling seems well suited for the exhibition of the rocky and rugged elements of the picturesque. "Pembroke Castle, South Wales," and "Moonlight" in Surrey, show the artist's capability in two branches of delineation. The latter is a fine vista through a pine wood executed in a vigorous style, though the clouds are rather black. "A quiet retreat, Pinner, Middlesex," admirably expresses the character of its title. The old house, surrounded by some lofty trees of birch and poplar, is cleverly rendered. In the etching "At Lyndhurst," the cottage by the roadside, the foliage, and especially the oak in the foreground, are very truthful in drawing, and there is a soft chalk effect in the etching of the foliage. We note also one or two architectural subjects, "Rue du Roi Priant, Rouen," a picturesque sketch, and a "Street in Rouen," with some old gabled timber houses. The portraits called "Captain of a Pilchard Boat, St. Ives," is a cleverly executed study of expression; the mouth and the pipe are exceedingly natural. Many of these etchings are in brown ink. Mr. F. Slocombe has a very different manner from that of his brother. There is a clearer and more decided execution, but we lose some of the softer effects. "Steephill Cave," "Isle of Wight," "Margate Harbour," and "Jetty," and "Colliers unloading, Margate," are all very cleverly drawn. There is a breadth of treatment, and a great deal of colour in the etching. "A Girl in the Costume of the latter part of the 16th Century" shows some skilful drawing and *chiaroscuro*. We only add here that these etchings can be purchased separately or mounted in portfolios, at 60 and 18 guineas respectively for each series.

A LOAN COLLECTION OF WORKS OF JOSIAH WEDGWOOD.

THE Liverpool Art Club have on view a fine collection of works by that incomparable potter Wedgwood, arranged as they are set out in his own catalogue. The promoters have been assisted by Messrs. Wedgwood in this task, and it is no exaggeration to say the series of works brought together has never been surpassed. As usual, the catalogue before us gives the visitor every information he can require. The marks on Wedgwood ware are made the subject of a chapter. Of these we find it stated "the marks of the good period are usually clearly and evenly stamped, and except upon glazed pottery and Queen's ware, easily deciphered. With the name is often found either single letters, numbers, or signs, scratched or impressed." Many of these are only workmen's marks. A rude K made with a point is found upon some of the fine busts attributed to Keeling. Various stamps are illustrated which will be a useful guide; but many genuine pieces of old Wedgwood are found unmarked. The introduction gives a sketch of the artist's history, from which we learn he was apprenticed to his eldest brother in 1744, and in 1752 commenced at the Bank Pottery, Stoke, in partnership with Messrs. Harrison and Alders. Pottery was at that time in a low state in Staffordshire, and Wedgwood helped to convert it into an elegant art. The manuscripts referred to give some interesting particulars. It may here be mentioned that Wedgwood was not an original artist. His Portland vase, so justly admired, was a copy, and his works were generally imitations of Classic conceptions. His cameos are accurate reproductions from antique gems and models. His copies from Romano-Egyptian gems are various. There is one, a figure of Apis, with a winged disc, and an emblem of the soul in cream-coloured biscuit porcelain 9-16 in. by 3 in. "A Figure of Osiris," various figures, &c., from Gnostic amulets. Classical subjects, some upon cream-coloured porcelain, others upon jasper ware, from gems are numerous: these vary from 1/2 an inch wide to 2 in. or more square. Portraits are common, often upon white jasper ware body with blue ground. Over a hundred cameos are mentioned. We may observe that the jasper ware surpasses for fineness and durability any other; and the most minute touches could be made upon it. The next section refers to the intaglios; these were also chiefly from antique gems. Most of these are in black basalt ware, oval in shape, and the average size about 3/4 in. and 1/2 in. They are impressed "Wedgwood and Bentley."

Some of these are executed for ornamental purposes, such as box-tops, watch backs, &c. Class II. contains a valuable collection of bas-reliefs, medallions, &c. They are chiefly in jasper of two colours, pale blue being a common colour, and are applied to cabinets, chimney-pieces, and other furniture. The subjects are largely chosen from Classical stories. We note No. 542, "Marriage of Cupid and Psyche," enlarged from a celebrated cinquecento gem, oval in form; also 538, 525, 585, Head of Medusa, modelled by Flaxman, circular in shape, the workmanship exquisite, and the colour blue body, head in white relief. Some of these are over a foot in length. Many are moulded from cinquecento works. One of the most interesting divisions of the exhibition is that containing portraits of illustrious persons of Greece, Egypt, and of Roman and European celebrity. These portraits are in basalt and jasper on coloured grounds, and their usual size is 2in. by 1½in. A regular series divided into kings and queens, statesmen, philosophers, and poets is catalogued. Most of the medals are double. The Roman history medals begin with Romulus to the end of the Consular Government, and include a series of 60 in number. The medals have cameos on both sides, thus the head of Romulus has a reverse, "Foundation of Rome"; the Rape of Sabine has on reverse, "Peace procured by Sabine." Heads of illustrious Romans, the Twelve Cæsars and their Emperors, heads of Popes (258 in number taken from Dasser medals) in basalt ware, heads of illustrious moderns are among the collection. The last group is the most interesting; they are in black basalt, or blue and white jasper, chiefly the latter, and generally oval. The catalogue contains a full description of each. The portraits have been modelled in some cases from life by modellers employed by Wedgwood; in the majority of cases, however, they are from medals, waxes, and engravings. These heads have often grounds of dark blue, reddish brown, and black. The groups of busts, vases, lamps, statues, &c., are also particularly interesting examples, and exhibit the versatility of the works of this master. The catalogue is a masterly work of the kind, and has been compiled by Mr. Charles T. Gatty.

CINGALESE ART REMAINS.

SOME explorations have been recently conducted in Ceylon on the site of the ancient capital of the Cingalese Kings Anuradapura, now in ruins. One Dagoba called the Thuparama, which has been uncovered must have been a magnificent structure in its perfect state. This building is supposed to enshrine the left collar bone of Buddha (some say the left jaw bone); but these relics were always deposited in golden caskets, beautified with profuse settings of gems of great value, before they were enshrined in the edifices erected for their reception. The Thuparama stands on a circular platform, the brick walls supporting it are of great thickness, and on the outside embellished with fine mouldings and pilasters of the same materials, though there can be no doubt that the whole of the outside, including the parapet which once encircled it, was originally covered with plaster, and possibly, too, decorated with paintings. This platform is paved with slabs of granite. On this platform are four concentric rows of graceful octagonal columns. The first row is close to the base of the Dagoba, the second row about 2ft. from the first, the third about 5ft. from the second, and the fourth row, the columns and capitals of which are carved from a single stone, is arranged round the margin of the platform. The capitals of the first two rows are ornamented along their upper edge with grotesque squatting figures, with arms upraised, as though supporting a weight resting on their heads; the third row has eagles standing upright with outstretched wings; and the fourth or outer row is ornamented in a similar manner with quaint dwarfed figures in every conceivable position. The tops of all the columns below the capitals, which are also octagonal, are ornamented with a fringe and tassels of very graceful design, those on the outer columns being of a very different pattern from those on the three inner rows. The height of the inner row of columns is 2ft., the second 22ft., the third 19ft., and the outer row (all monoliths) 14ft. Between the third and fourth

rows of columns there was evidently a wall, no longer in existence, the stone foundation of which, slightly raised above the rest of the pavement, can be very easily traced. The rows of columns round the Dagoba are arranged in quadrants so as to form a rather broad passage to each of the cardinal points of the Dagoba, where there was probably an altar close to its base. At the east and west sides of the building are fine sets of stone stairs reaching to the platform, 14ft. above the ground, the steps having been ornamented with carved stones, and wing walls, now thrown down, which were finished off with flat stone slabs richly carved with figures bearing bowls or vases containing the sacred lotus flowers. These carved stone slabs still remain in position, but some are broken. Opposite the landing of these steps, and in a line with the foundation of the circular wall which is supposed to have once encircled the Dagoba, will be found a double step carved out of one block of stone and mortised above to receive the stone door frame, which once formed the entrance, and this goes further to favour the supposition of a wall having previously existed. The object of these beautiful stone pillars and wall was undoubtedly to sustain a magnificent conical roof, which would have covered the whole of the Dagoba. The interior of this roof, the Dagoba, columns, walls both inside and out, altars, and, in fact, everything about the building must have originally been most gorgeously painted. That it was so is pretty clearly proved by the recent excavations most carefully made both here and in other places, where thin coatings of very fine plaster are found covering the stone and brickwork, with traces of bright colours. At the Ruamveli Dagoba some fine paintings have been brought to light. The height of the Thuparama is 62½ft. from the pavement at its base, the diameter of the base 59ft., and the lower part of the plain bell, 33ft.

HOUSEHOLD SANITARY ARRANGEMENTS.

THE first of a course of six Cantor lectures on "Dwelling Houses: their Sanitary Construction and Arrangements" was delivered by Dr. W. H. Corfield, M.A., Professor of Hygiene at University College, at the Society of Arts on Monday evening. A number of specimens from the Parkes Museum of Hygiene were exhibited in illustration of the lecture. Where choice of situation was at all possible, the "exposition" of a house was of importance; a house facing east would be exposed to cold and dry winds, and facing south-west to driving rain. More important than this was the character of the soil beneath a house. Soils were divisible into two classes, those pervious and those impervious to water. Typical of the former class were gravels and sands; then came loose limestones and sandstones, and other rocks through the masses of which water could percolate; chalks, and the limestones and granites so freely fissured that water could easily escape. In the other class were the clays and marls. Each class of soil was under certain conditions dangerous to the life of those living in houses built upon it; the dwellers upon impervious soils were liable to consumption and rheumatism, those on pervious soils to typhoid fever and to cholera and other epidemics when those had obtained entrance into the district. In this choice of evils there might at first seem little preference, but this was not the case. The dangers of pervious soils were not only less fatal, but could be more easily coped with, and chiefly by lowering the sub-soil water, so that it did not approach the level of the foundations of the dwellings. Towns were often built in basins of pervious soils resting on impervious ones, and these basins were sometimes waterlogged to a considerable extent. In such towns, whenever this ground water had been lowered by drainage the deaths from consumption had decreased. Specimens of agricultural drain pipes were exhibited, and it was shown that drains, unlike sewers, ought to be but loosely jointed and laid with regular fall. Passing on to notice the foundations of houses, the dangers of "made earth" were indicated. Such sites ought not to be built upon for a considerable time, for it had been shown by Drs. Parkes and Burdon Sanderson that the organic matters in them slowly became innocuous by subterranean oxidation, and they should then be covered by a layer of concrete,

not only upon the entire surface to be occupied by the house, but also for a considerable distance beyond. The materials of foundations ought to be, for sanitary, as well as constructional reasons, exceptionally good, but as a rule they were the worst used in the fabric. The surface of the basement should be covered with water-proof and air-proof material. One mode of doing this was by Pritchard's patent flooring, which consisted of a series of agricultural tiles laid side by side, upon them being a layer of concrete, which could either be left plain or faced with asphalt or tiling. No wooden floors should be laid in basements, which ought not to be used for other than cellarage purposes, and certainly not as sleeping apartments. Just above the ground level a damp course of any impervious material should be laid all round the house; for this purpose cement should not be used on account of its liability to crack. Another misapplication of cement was sometimes seen on brick houses built on damp sites; in these, unless precautions were taken, the subsoil water often rose by capillary attraction, and to render the house less damp, the walls were frequently plastered with cement. The consequence was that the water which had evaporated on both surfaces of the walls could now but escape into the rooms, and thus the remedy was worse than the disease. Dry areas, well drained, should be provided outside the houses. For walls the most fireproof material was brick, and next it concrete, for both had already been burnt. Where walls were exposed to much rain they should be protected either by being faced with glazed bricks or hung with tiles or slates, and, if of brick, it was wise to build them hollow. Chimney flues should be as straight as possible, kept separate from each other, and where practicable, lined with pipes to facilitate cleansing and reduce the danger of spread of fire. It was desirable floors should be fireproof; if of timber the boarding ought to be so laid and pugged as to prevent the passage of air from the rooms below. It was essential to durability that the space between floor and ceiling should be ventilated by external gratings or otherwise. A new method of ventilating rooms and floor-joists, now under trial, for which some advantages were claimed, was known as Ellison's patent conical ventilator. It consisted of bricks pierced in couples, with cone-shaped apertures, the small hole being placed outwardly and communicating with the interior of the house by a broad shallow hollow. It was claimed that heat and air would enter by the small hole, and would be so reduced in velocity that its entry into a room would cause no perceptible draught. In roof construction it was desirable that no cornices or eaves' details should drip upon the walls of house. Gutters behind parapets ought to be wide enough to allow a man to stand in them, and means should exist for facilitating the removal of snow; if allowed to accumulate it slowly melted and would find its way through the roof. The point that all rain-water pipes should be kept outside the house was insisted upon. The lecturer had traced many cases of diphtheria and other illnesses to the bringing or rain-pipes through rooms from the front to back of houses, &c. Bits of leaves and rubbish fell into these pipes in spite of wire guards, and there decomposed. Another common danger was the opening of pipes below bedroom windows. Floors were best polished and bees'-waxed, or laid with parquetry—plans adopted in the best hospitals, where cleanliness was a primary necessity. Skirting boards should be let into grooves, to prevent dust accumulations and draughts resulting from subsequent shrinkage. If carpets were used a space should be left all round to facilitate frequent and easy cleansing. The best wall covering was tiles, if well laid; if plastered, it was much better painted. Wall papers were open to grave objections: they harboured dust and disease-germs, could not be thoroughly cleansed, and frequently their colours contained arsenic, more especially the green and brown shades—a cause of much unsuspected suffering. For these reasons ceilings should not be papered; if of wood they should be panelled. All wood-work should, as far as possible, be polished, stained and varnished, or painted.

The President of the Royal Institute of British Architects has received a compliment from Austria. Mr. Charles Barry has been elected an Honorary Member of the Imperial and Royal Academy of Fine Arts of Vienna.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the Association was held on Friday evening; the President, Mr. H. L. Florence in the chair. The following new members were elected:—C. C. Bradley, A. Nixon, F. Littlewood, W. Pope, Christopher E. Rondell, and E. A. Woodrow. A vote of thanks was passed to Mr. Bentley, the architect of St. Mary's R.C. Church, Cadogan-street, for permitting the members of the Association to visit that edifice, and it was announced that the next visit would take place on Saturday, the 22nd inst., at 3 p.m., and would be made to Alexandra-mansions and Members'-buildings, Victoria-street.

THE INTERNATIONAL CONGRESS OF ARCHITECTS AT PARIS.

Mr. R. PHÉNE SPIERS read a paper descriptive of the proceedings at this Congress, which he attended as delegate from the Architectural Association. The Congress was, he explained, organised by the Société Centrale des Architectes, an organisation corresponding roughly to our Institute, but with a membership of 330, and in communication with 15 provincial and 12 foreign societies, of which the Institute is one. Delegates were sent from most of these societies, and over 450 architects from all parts of France and foreign parts signed their names as attending the Congress. The general meetings were held in the Palace of the Trocadero, and the sectional meetings in some of the unoccupied bureaux in the Tuileries. The first meeting took place at the Trocadero on Monday, July 29th, under the presidency of M. Lefuel, architect of the modern parts of the Louvre and the Tuileries, when M. Hermant read a paper "*L'Esthétique à la portée de tout le monde*" (*Esthetics placed within the reach of Everyone, or Esthetics for the Million*), the purport being that Art is regulated by certain definite principles and laws, which ought to be laid down and determined in the same way as those of science. For an object to be beautiful it must conform, he argued, to the usual type of its class, as a whole and in all its details and proportions. The argument should have been carried a step further, but M. Hermant disclaimed any intention of himself laying down the laws governing esthetics, and simply introduced the subject. Unfortunately, as no discussion was allowed at the meetings, the subject dropped at its birth. On Tuesday a paper was read by M. Courau on "*The Education and Professional Status of the Architect*," in which he set forth the invasion of the architect's province of work by the engineer, placing the former in a very precarious position, especially in the provinces. Persons without any architectural instruction, he said, uneducated though acquainted with the customs and a few of the technical terms used in building, assume the title of architect, and either by unscrupulous conduct or ignorance bring discredit on the whole profession. As a remedy for this, M. Courau advocated the establishment of a diploma, which would require from the average run of architects such a course of study as would be a guarantee to the public, and eventually raise the standard of the profession. The idea of the institution of a diploma originated, he reminded members, with the Société Centrale, and might well be taken up again and brought to a definite solution. M. Gueset warmly urged the Congress to take steps to prevent the taking of illicit commissions, which more than anything else was bringing the profession into discredit. Mr. R. Phéne Spiers gave a description of the architectural examination organised by the R.I.B.A. in 1862, and deplored the fact that owing to the apathy of the committee, especially during the last few years, the scheme had well nigh fallen through. Señor Bohinas, secretary of the Central Society of Architects in Madrid, informed the Congress that in Spain the obtaining of the diploma was a necessity for those practising as architects. There was a school of architecture in Madrid, three years being the usual period of study, at the end of which an examination was held, which might be gone through by those who came up from the country or preferred private study to that of the school. Four years had then to be passed in an architect's office and on works in progress, after which a second examination had to be passed, which confirmed the diploma. Herr Klein, the delegate from Copenhagen, stated that there was a diploma in Denmark, but not compulsory; thus there were two classes of architects—those

who had obtained the diploma, and those who had not. Some of the diplomaed architects were men of very little ability, and some of the other class of considerable talent, so that he did not consider the diploma was of any value. M. Jean Strohman, councillor of state, professor of architecture, and master of the Imperial Academy of Fine Arts in St. Petersburg, spoke of the unsatisfactory position of the architect in Russia, and advocated a diploma. It was intended to return to the subject on the following day; but there being no time set apart for it, it dropped. M. Dutert then read a paper on the architectural designs exhibited in the Salon of 1878, and Mr. R. P. Spiers gave, by desire, a description of the career of an architectural student in England, and an account of the condition of architecture in that country. General surprise was excited that the system of pupilage yet prevailed in this country, and the statement that premiums of from 100 to 200 guineas were frequently paid to secure admission into an architect's office created amusement. In the afternoon, another meeting was held, at which M. Davioud read an essay, "*On the Union or the Separation of the Architect and the Engineer*," which had gained a prize from the Académie des Beaux Arts. The author divided his subject into four parts:—1st, What is the State Engineer? 2nd, What is the Civil Engineer? 3rd, What is the Architect? and, 4th, What are the actual relations between engineers and architects, and what should be done to improve them? In answering the first question, M. Davioud described in detail the organisation of the Corps des Ponts et Chaussées, distinguishing between the mining engineer, the engineer who formed part of the service of bridges and highways, and the military engineer. He contended that centralisation and subordination of one to another had suppressed the initiative of the individual, and consequently all originality and artistic feeling was lost. The State engineer had his life so marked out and defined that he is unable to free himself from the trammels imposed on him, and eventually becomes a mere wheel in the great machine which constitutes the French Board of Works. He considered that the course of study pursued by the State engineer in the Ecole Polytechnique is too theoretical and abstract, and its tendency is to form a body of men who do not draw or even make calculations, but prefer to alter, correct, and sign what is submitted to them, and to make work for the engineers, inspectors, and architects placed under them. Many, however, of the most eminent engineers connected with the French railroads have left the State service to design and carry out the roads, bridges, and machinery of railway companies. In answer to the second question, it was shown that the civil engineer is free and independent. The course of education he has gone through at the Ecole Centrale des Arts et Manufactures is of a more practical kind. The student has to go through a course of construction which might be turned to account in architectural design. Leaving the Ecole Centrale with his diploma, the civil engineer goes into the works as a subordinate, which enables him to study and ask questions without compromising his dignity. Employed in private interests, he is obliged to work hard to acquire his position, and to display a considerable personal value before he can reach the post of chief engineer. M. Davioud does not consider that the civil engineer has done much harm to architecture. He has raised construction to the height of an experimental science, and he has allowed France to rival England by a judicious and economical employment of materials. The civil engineers in France are increasing in number and in public esteem, because they are forced to work, and not allowed to sleep in the enervating atmosphere of "functionarianism." It is to be regretted that they are not artistic. M. Davioud thinks, however, that art is again asserting itself in connection with scientific construction, and foresees the time when the metallurgist, the savant, the ironfounder, and the architect, working together, will produce features of unknown beauty, causing a revolution in art as great as that which took place when Arcuated took the place of Trabeated architecture. In answering the third question, M. Davioud discussed the reasonableness of the law in allowing anyone who chose to call himself an architect. He declared himself a partisan of complete liberty, and considered it was for the client to find out how to obtain capable and fit persons to work for him. As yet, he considered that architects

had never taken sufficient trouble to enlighten the public on the value of the men of merit in the profession, and the equality of salary which they have adopted (by a fixed scale of charges) is not likely to make people believe there is much difference in the merit or talent of those who practise. He classed the 4,000 architects of France into three categories—1st, those who are veritable artists, of whose talent and knowledge there is no question; 2nd, those who have desired to place themselves in the first category, but whose qualifications have not risen to the standard, who nevertheless have become practical architects with business-like qualities; and 3rd, the "usurpers"—men who have gone through no serious course of study, but who have picked up such a superficial knowledge as enables them to compete with talent, and who demand 5 per cent. or even less if they can get it. The weak and enervated individualism of architects was contrasted with the spirit and energy of the civil engineers with their magnificent meeting hall in the rue de Faubourg Poissonnière. Passing on to architectural education, the great improvements made in the Ecole des Beaux Arts were recognised, but it was contended that there is still much room for reform. He believed that the various studies required of the young architect would invigorate him and prevent his becoming a mere decorator or designer on paper. If they compared the work done by the State or civil engineer in the same time as that of the architectural student they must be convinced that if a struggle ever took place between the two professions the architect must go to the wall. In examining the fourth question, the union of architects and engineers, M. Davioud considered architects have obtained most valuable information from the civil engineers on all questions connected with the science of building; any union with the State engineer would, however, he thought, be fatal to the profession. Architects had been called in by the State engineer for public service with disastrous results to the credit of their profession. Already it is a question of establishing a staff of municipal and provincial architects, under which system he contended the architect's art would be lost and he would become a simple functionary. From the civil engineer, however, the architect has nothing to fear but simple rivalry, and a union between those professions was recommended. This essay occupied three sittings, but was followed by no discussion. On Wednesday two sectional meetings were held, the first subject being the scale of charges. M. St. Ginest, President of the Toulouse Architectural Society, urged the importance of drawing up some definite scale of charges applicable to all France, and mentioned that at Marseilles the German sliding-scale had been accepted. The latter system was condemned by M. Ravon, who said any scale should be perfectly clear to both contracting parties; the five classes of building in the German scale would lead to endless disputes and litigation. The subject was again taken up on Friday, when Mr. Spiers described in detail the English system, including the positions held by quantity surveyors and clerks of works; the latter were totally unknown to French architects. On Saturday the matter was again considered, when M. Davioud urged that until there was a compulsory diploma, there ought to be no fixed scale of charges, or the artist would be in the same category as the first comer who might choose to call himself an architect. M. Lucas pleaded that it would be a very difficult and delicate task, to determine the artistic merits of the various members of the profession. A resolution was brought forward by M. Davioud, to the effect that the congress considered that "each architect has the right to adjust the value of his services, according to his own estimate of what would be a just recompense for his talent." There were many dissentients from this mode of leaving the question open, and ultimately it was carried with an addition, stipulating, that in the absence of any preliminary arrangements, the scale of charges fixed by the Council of Public Buildings in 1803 might be accepted as a minimum. That scale was: for drawings of every kind 1½ per cent.; superintendence of work 1½ per cent.; quantities and specifications, 2 per cent.; total 5 per cent.; but besides this a French architect charges a fee of from 6 to 8 frs. for arbitration, and 1 fr. per mile travelling expenses. Returning to the Wednesday meeting in the second section, the education of working men was there taken up, and M. Lucas read a paper advocating the establishment of a technical school of apprentice-

ship for workmen of all classes, instead of the present system, by which they pick up their information as best they can. In the afternoon M. Trelat, Director of the Ecole Centrale d'Architecture, delivered an eloquent address, in which he contrasted the aim of the architect with that of the engineer. The architect has three conditions to fulfil: to distribute, to form, and to construct. When we examine these conditions, we see the great difficulties with which he has to contend, for these are absolutely contradictory to one another. When the plans, elevations, and sections have been distributed in accordance with the conditions required, then the artistic element has to be considered, and various changes made to bring both into accord. Both may require further alteration and modification to bring them in accordance with structural necessities. We see buildings admirably constructed, as far as stability, economy, and excellence of materials go; but they are incompatible with architectural beauty; they have neither style nor expression. The engineer can plan and calculate the strength of materials; the contractor can build: it is the architect's mission to unite the two with beauty and expression. To do this he must sometimes sacrifice a part of his art; but if he allows the unity of his design to be sacrificed he abandons his special characteristic. The engineer is young—he dates only from the 17th century, but he is at present the conqueror. He has only two conditions to fulfil—to distribute and to construct; with form and unity he does not concern himself. The education he requires is quite different from that which the architect should possess. M. Trelat advised architects to take up those special studies for which his school was established. There, he said, he insisted on a better groundwork of knowledge of the sciences, and of the theory and practice of the economy of construction. There was a large staff of professors, and periodical examinations held. After three years here most of the students proceeded to the Ecole des Beaux Arts, to acquire proficiency in artistic design.

(To be Continued.)

ROYAL ACADEMY LECTURES ON ARCHITECTURE.

ITALIAN GOTHIC IN SECULAR BUILDINGS.

PROFESSOR BARRY devoted his third Academy lecture to the consideration of how Pointed architecture was applied by the architects of Northern Italy to secular buildings. The period of the Renaissance under consideration was, he observed, a time of transition from ecclesiastical to civil policy; under the influence of democratic ideas, the principal Italian cities vied with each other in erecting noble civic buildings. The town hall generally asserted the importance of the rulers, and was dignified in its architecture, and marked by a characteristic campanile, the symbol of power and independence. But these Italian Gothic campaniles must, he considered, be deemed rather interesting than admirable, in an architectural sense. Rising straight from the ground without buttresses or breaks, usually plain and destitute alike of ornament and of light and shade, a well-designed upper story was but a poor compensation for so much effort exerted for so small a result. The general characteristics of designs for civic buildings did not materially differ from those of other Italian Gothic work, but the horizontal principle was more marked, and the approach to Classicism somewhat nearer than in ecclesiastical examples. A free use of the pointed arch was balanced by the absence of vertical piers or buttresses, and by the strongly marked horizontalism of string and cornice. The latter feature is, indeed, specially suggestive of a Classic origin. It was composed of groups of mouldings, of moderate size and prominence, suitable to construction in brick, the material mostly used. Enrichments of regular forms, not always beautiful in themselves, were arranged in horizontal bands of ornament, and below small arches, either machicolated or intersecting each other. In Venice the erection of the Ducal Palace formed an epoch in Gothic art. In it we find the same half-application of Gothic principles which mark Italian Gothic. Perhaps the most striking feature is the thick and massive tracery. It is strong enough to serve as a constructive feature supporting the fabric above. It is indeed a beam of marble, perforated with quatrefoil openings, laid upon numerous supports, to

which it communicates the strain of support. To counteract the opening thrust upon the joints of masonry, iron tie-rods have in many cases been added from capital to capital. The arcades of the Ducal Palace are very beautiful, and afford a remarkable lesson as to the disposition of light and shadow. Assuming the propriety of the conception, and taking the quatrefoils of the tracery as forming a level band of enrichment, no sculpture, in such a position, would produce the effect of these simple forms, with square edges, displaying themselves in clear-cut prominence against the shadow behind them. In the other portions of the elevations there is little of interest, for the admiration it has received has been due to its associations, and to the charms of certain details, rather than to any excellence of the composition as a whole. The heavy box-like upper story comes down with apparently crushing weight, upon the pierced arcades below, and if it had not been for the relief given by the application of colour to the vast plain surface, the effect would be much worse than it is. The whole wall space, where not perforated by windows, is covered with a diaper pattern, composed of pieces of different coloured marbles. The effect is curious, rather than satisfactory; but if the object were to lighten the appearance of a great unbroken mass, the expedient must be pronounced successful, to a considerable extent. The general question of coloured decoration is a point on which it is difficult to insure any consensus of opinion, for it is largely a matter of taste. The addition of the work of the sculptor and the painter to a structure will not make the latter architecture, if it be only building; and still less can such a miracle be effected by the humbler efforts of the decorator or the veneerer. To test the architectural merits of an edifice, we may ask, how would it appear if destitute of the added ornament of colour? If the upper story of the Ducal Palace were painted in a uniform grey tint, could it be admired as a work of art? Or take another instance; would not the Church of St. Mark, Venice, lose all its charm if the varied hues, rich mosaics, and costly marbles were obliterated? Colour may add to architecture, but it cannot take its place; and though it may modify objections, and soften deformities, it can never atone for bad art. Poverty of design will always declare itself, and it is never more objectionable than when it puts on the disguise of ill-considered contrasts of particular coloured brickwork. It is the architect's business to build pictures, not to paint them. The Italian architects were not accustomed to vary the colour of their brickwork, which was generally red. Where variation was desired, it was obtained by a sparing use of stone or marble. With us, to whom it is easy to obtain bricks of different colours, the temptation to use a variegated surface has proved irresistible, and has injured many a good design, cutting it up into small parts, so as to resemble a pavement set on end, or Tunbridge-ware manufactures. Decoration of this kind should be temperately applied, if it is to please, and the lines of colour should have reference to the constructional forms of the building in which it is used. The horizontal courses of black and white marble, to be seen in Italy, in the Broletto at Como, and the cathedral of Siena, are open to question, and would be more pleasing if the contrast of colour were less marked. The great opponent, however, of colour in English architecture is the damp atmosphere, and the smoke and dirt of our great towns. Public buildings with us begin to lose their beauty almost before the scaffoldings are removed, and the most delicate details, whether of carving or of colour, are the first to disappear, in dismal smears of blackness. Until some improvement can be obtained in this matter, the architect's work is somewhat disheartening, and delicacies of expression in external work are put out of his reach. In this scientific age, asked Professor Barry, is chemical discovery, which in its pursuit of gain has poisoned rivers, and rendered smiling valleys as bare and desolate as if a plague of locusts had ravaged them, powerless to aid in purifying the air we breathe?

On Wednesday, the 12th of February, the Church of St. John, Great Yarmouth, was reopened after the addition of north aisle, transept, and porch. The cost of addition is about £1,050, including benching, and 180 fresh seats are provided. The works were carried out under the superintendence of Mr. H. Olley, the architect.

GAS IN THE HOUSE.*

A HANDY little brochure under this title offers some very sensible remarks upon gas lighting. Its author, Mr. H. Faraday, wisely refrains from taking a partisan's view of the merit of gas as a lighting agent, for he frankly admits the superiority of the electric light, but he shows truly enough, as gas was tardily adopted and struggled into use long after the discovery, so it is certain that the electric light will take a long time before it takes the place of gas for domestic use. At least it is certain not to die a sudden death; for, notwithstanding the supremacy of gas, there is still, as we are told, a brisk demand for oils and candles. Mr. Faraday proceeds to lay down a few rules, and to offer some suggestions that will be read with interest just now by the gas consumer. The trade of gas-fitting has no doubt fallen into disrepute from the indifference of customers when ordering fixtures, though we are inclined to think also the gas companies have not been so liberal nor so eager to promote efficiency as they might have been. Among the practical rules given by the writer are the following:—That no pipes of a softer material than iron or brass should be hid from sight; all pipes in basement should be laid with a slight fall towards the meter, thus lessening the chances of obstruction from condensed gas and assisting the upward pressure; no gas pipe under 5 feet should be of less bore than $\frac{1}{2}$ in.; if for more than 2 burners not less than $\frac{3}{4}$ in.; over 6 burners $\frac{1}{2}$ in.; 10 burners $\frac{3}{4}$ in.; 15 burners 1 in., and so on, while in pipes outside building, these sizes should be doubled nearly, to make allowance for internal corrosion. No metal burner or outlet should be used, for the metal is apt to corrode and impair shape of flame. Burners of varying cheek power should be distributed throughout the building, with due regard to the average gas pressure at each light, so as to avoid fizzing and drowning. All gas used for heating purposes should be consumed in a burner that provides an intermixture of air before ignition, and the flame should burn blue. Gas stoves should have a discharge tube for the burnt gas, of not less than $2\frac{1}{2}$ in. diameter, which tube should communicate with a brick flue. All pendant fittings not of iron, or not strengthened by an interior tube of that metal, should be provided with a cup and ball, or other loose joint at top. No globes should be used with fish-tail burners that have an opening at bottom of less than $2\frac{1}{2}$ in. diameter. For small gas escapes ordinary yellow soap slightly moistened, is a good temporary remedy. Referring to ordinary lighting fittings, it is recommended that for basements the tubes be of iron instead of brass. For halls, a lamp with large door and divided panes that may be readily cleaned is preferred, the vestibule globe lights being expensive, and when broken not easily repaired. The author justly thinks it inhospitable to leave the steps to entrance in darkness, and for this reason pleads for the fan-light lantern which lights both interior and entrance steps at once. He thinks, however, these lamps may be made more interesting and architecturally in harmony with the lines of doorway, and also may be adjusted so as to make the number on door discernible at night time. For the dining-room the fidgety jets of gas from a chandelier are condemned, and the argand or ring-flamed burner recommended in its place as more powerful and steady. It may be fitted up with a large opal reflecting glass and fringe. The same burner is suggested for the library, and a ventilating pendant. For staircases, a bold scroll arm from landing supporting a central hanging lamp, is preferred to wall brackets, or perhaps standard lamps fixed to the newels of stairs. The hints on fittings are useful, and we are glad to find polished brass recommended. Sunlights are spoken of as the best means of lighting large halls, staircases, picture galleries, and smoking-rooms; and gas-pipes and stoves are advocated for bedrooms, as they create no dust or smoke, and require no raking or stirring.

The death is announced in Munich of the well-known historical and fresco painter Michael Echter. He was a pupil and admirer of Kaubach, whom he took for his model, though the latter was only a few years older than himself, and whom he aided in the execution of his famous staircase pictures in the new Museum at Berlin. He was born in 1812, and his career was brought some time ago to an early end by the loss of sight.

* Gas in the House. Some Hints and Suggestions by H. FARADAY.

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ILLUSTRATIONS.

MAYO COLLEGE, AJMER, INDIA—CONDEMNED CHURCHES IN THE CITY—LLANERCH PANNA, NEAR ELLESMERE—WALL-PAPER DECORATIONS, BY JEFFREY AND CO.

OUR LITHOGRAPHIC ILLUSTRATIONS.

MAYO COLLEGE, AJMER, INDIA.

THIS exceedingly interesting design, by Major C. Mant, R.E., the architect for the proposed Mayo College, about to be erected at Ajmer, India, is well worthy of illustration as an adaptation of the native styles of architecture to modern requirements. Usually a sort of Classic style of architecture has been employed for the modern buildings in India, such as the Court of Small Causes, Calcutta, erected by Mr. Hugh Leonard, Chief Engineer to the Government of Bengal, assisted by Mr. W. H. White, F.R.I.B.A., while on the other hand several very clever buildings have been erected after the Gothic manner, chiefly in the style of Early French, by Mr. Wm. Emerson,* long time resident in India. We have also buildings in the Gothic style, by Sir Gilbert Scott, Mr. Roger Smith, and others. Major Mant however, has boldly taken the indigenous ancient style, and we venture to think has produced both a suitable and essentially modern building. The several apartments are clearly shown by the ground plan given with the view.

CONDEMNED CHURCHES IN THE CITY.

SS. Anne and Agnes.—Formerly called St. Anne-in-the-Willows, but for what reason is not known. This church has been twice destroyed by fire—in 1548 and 1666. After the last fire the parish of St. John Zachary was united to SS. Anne and Agnes, and the present building was finished by Wren in 1680 at a cost of £2,448 0s. 10d. It was afterwards "beautified" in 1703.

St. George, Botolph-lane.—The first authentic date of this church is 1321. It was rebuilt after the Fire by Wren at a cost of £4,509 4s. 10d. At the west end is a tower of simple proportions 84ft. high, but which cannot be seen to any advantage owing to the extreme narrowness of the surrounding lanes. The sketch herewith shows the east front. These drawings, together with those given Dec. 6th, 1878, were made from sketches on the spot by Mr. Robert Kendrick, of Warrington, and Mr. Jesse F. Scott, Stamford Hill, London.

LLANERCH PANNA, NEAR ELLESMERE.

THE two views and plans of this house illustrate clearly its arrangement and construction. The principal block is now nearly completed, and the kitchen offices will be erected when the old house adjoining is removed. It was desired to construct the building in the timber framework which was once so generally employed in Shropshire and the adjoining counties, and the whole of it has been executed solidly in English oak, and filled in with brickwork, which is covered with cement between the timbers. The chimneys are faced with red Ruabon bricks, and the roofs covered with brown tiles. The windows are filled with lead lights, those in hall having

shields bearing the arms of the Kenyon family. The hall, dining-room, and Mr. Kenyon's room are lined with old brown oak panelling up to the ceilings, the chimney-pieces, doors, &c., being designed to accord with old work and executed in oak. A gallery is carried round the hall at the level of the chamber floor, communicating with the various rooms, and leaving the centre portion of the hall open to the roof, which is open timbered. Mr. W. E. Samuel, of Wrexham, is the contractor for the work, which is well carried out. The architect is Mr. John Douglas, of Chester.

GOLD MEDAL WALL-PAPER DECORATIONS.

OUR double-page plate this week is devoted to the illustration of the two designs for wall-paper decorations to which the gold medal of the late Paris Exhibition was awarded last year. The authors of the designs are Messrs. B. J. Talbert and Walter Crane, and the manufacturers are Messrs. Jeffrey and Co., of 64, Essex-road, Islington. We have seen the several renderings of these patterns, and they are certainly equal to anything of the kind which we have seen before. The richness of colour and spirited drawing in Mr. Talbert's design is well worthy of its author. The frieze, which in this design is but 11½ inches deep, carries out the treatment of the sunflower as employed for the general wall paper. The dado is of a geometrical pattern, well suited to its position, and capped by a rich band of continuous ornament. Mr. Crane's design is very delicate, and quite characteristic of this well-known artist. The author thus describes his design:—"In the arabesque, the ever-ascending stem and interlacing branches may figure the constant growth of an ideal life, like a tree bearing flowers and living fruit. Amorini suspend its festal garlands, and light the flame of its thoughts, or play with the masks of grief and gladness, overhung by the bow and quiver of Love, and crowned with his roses. Pride and splendour as of the peacock lodge in its boughs, and the craft of the serpent is ruled over by the benign wings of the dove, while the corn is ever in the sickle, and the cornucopia full of fruit. In the frieze, the peacock stands as the emblem of the day. As in the arabesque and the frieze we have the elements of the earth, air, and fire of life, so may the dado be emblematic of the 'water which is under the earth,' or the cold and silent hours of life which glide by like the silver fish in their spheres." We hope shortly to devote another page to the illustration of two similar designs for decoration, manufactured by Messrs. Jeffrey and Co.

COMPETITIONS.

NEWTON ABBOT.—Ten designs have been submitted for the proposed Coffee Tavern at Newton Abbot. The first premium of £20 has been awarded to Mr. Charles Jenkin Jones, of 8, Buckingham-street, Adelphi, architect to the London Coffee Tavern Company, and the second premium of £5 to Messrs. J. W. Rowell and Son, architects, of Newton Abbot and Torquay.

SOUTHPORT PROMENADE EXTENSION SCHEME.—Sixty-seven sets of designs were sent in to the Improvement Committee of the Southport Corporation in competition for the awards of thirty guineas, twenty guineas, and ten guineas for the three best designs for carrying out the scheme of extending the Promenade as far as Park-road at a cost of £40,000 or £50,000. After examination this number was reduced to fifteen, and the fifteen to three—"Vive la Mer" "Sexagesimus," and "Advance," to which they recommended that the prizes should be given. On Monday night the General Purposes Committee met and confirmed the recommendation. The successful design—"Vive la Mer"—is the production of Mr. G. Heaton, architect, of Wigan. "Sexagesimus" is the design of Messrs. Goodison, Atkinson, and Ford, of Liverpool; and "Advance" that of Mr. J. Sidebottom, of Blackpool. It is expected that the extension scheme will now be pushed forward with all speed.

WEDNESBURY.—In the recent competition for the two schools for the Wednesbury School Board, as we stated on p. 143, the designs of Messrs. Alexander and Henman were successful for the schools in Lower High-street, and those of Mr. Ettwell, of West Bromwich, for the New Town Schools. For the former the plans of Mr. R. F. Matthews, of Birmingham, and for the latter, those of Mr. C. Newman, of Wednesbury,

were placed second, the designs of Mr. S. W. Grant, of Duke-street, Adelphi, being third in both competitions.

SCHOOLS OF ART.

LINCOLN.—At a meeting held recently in the Memorial Hall, Lincoln, resolutions were passed appointing a committee to consider the desirability of purchasing the old Lincoln County Hospital for the purposes of an art museum. At the close of the meeting the annual distribution of prizes to the students at the School of Art took place. The report spoke of the excellent character of the work done during the year. One silver, and three bronze medals, three Queen's Prizes of books, and fourteen third-grade, and nine second-grade prizes, had been awarded by the Department, who had also purchased a study in chalk. At the second-grade examination in May, 43 were examined, of whom 41 passed and nine obtained prizes from South Kensington. A number of local prizes were also given. The silver medal offered by Alderman Rorston was awarded to Henry Elmitt, a pupil with Messrs. Bellamy and Hardy, architects, of Lincoln, the fourth medal carried off by pupils with this firm.

PARLIAMENTARY NOTES.

THE GAS COMPANIES.—Sir W. Lawson, on Monday, asked the Chancellor of the Exchequer whether the Government intended to bring in any general measure with reference to the gas companies in case the electric light should be perfected for general use. The Chancellor of the Exchequer said the Government had no general measure of that character. He understood from his hon. friend the Chairman of Ways and Means that he proposed to refer the various private Bills introduced this Session to one strong committee.

PREVENTION OF FLOODS.—In answer to Mr. A. Peel, Mr. Cross said that the Lord President would before long introduce in the other House a separate measure dealing with the question of River Conservancy and the Prevention of Floods.

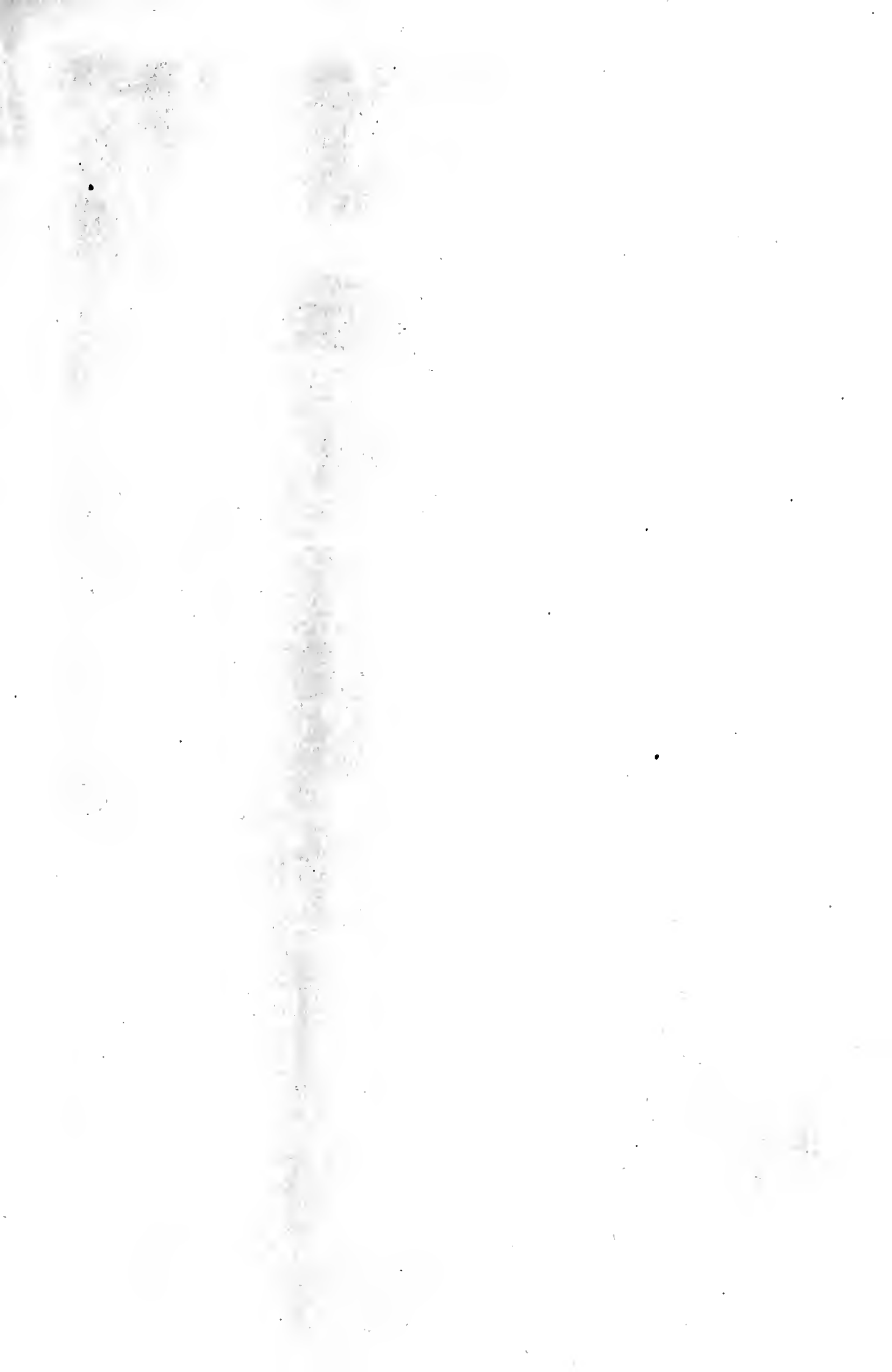
THE NEW LAW COURTS.—Mr. O. Morgan, on Tuesday asked the First Commissioner of Works whether he could state when the new Law Courts would be sufficiently advanced to admit of the transaction of business. Mr. Noel.—There were originally two contracts for the new Courts of Justice; according to one the eastern wing ought to have been completed during the year 1877, but, unfortunately, owing to frosts, strikes, and other unforeseen circumstances, the work was delayed; but I am happy to state that it is now ready for occupation, with the exception of some minor details connected with furniture and fittings. The legal authorities are now considering the question of the apportionment of accommodation and of removal, which will take place at their convenience. The main building should, according to contract, be completed during 1880; but it is impossible at this moment to fix any precise date at which it will be finished, but every exertion shall be made to hurry on the work.

A Local Government Board inquiry was recently held at Caerwys, near Wrexham, by Major Tulloch, with reference to a proposal to supply Caerwys with water from Flynnon Deg, and for the formation of a special drainage district. It was stated that the scheme was prepared by Mr. Humphreys, the sanitary inspector, and was to pump water from Flynnon Deg at an estimated cost of £400. The area of the proposed drainage district was 25 acres, the population 370, and the rateable value £5,000. Major Tulloch said he had never heard of so small an area, and could hold out no hopes that it would be sanctioned by the Local Government Board. It was eventually agreed by the meeting that application should be made for the whole parish to be constituted into a drainage district.

A meeting of Freemasons was held at the Freemasons' Tavern, Great Queen-street, W.C., on Tuesday week, for the purpose of forming a committee to restore in whole or in part the west face of St. Alban's Cathedral. Mr. John Chapple, the clerk of works at the cathedral, explained the work proposed to be done, and the committee was appointed, Earl Skelmersdale being nominated as chairman. The maximum subscription was fixed at £5, and a preliminary list was read.

The Rural Sanitary Authority of Erpingham, Norfolk, having applied to the Local Government Board for sanction to borrow a sum of £5,000, an inquiry was held, before Major Hector Tulloch, at 11, on Wednesday week. After hearing evidence for and against, and viewing the town, the inspector said he should intimate to the Board that the proposed scheme of drainage was not wanted, and that the water scheme was impracticable.

*See BUILDING NEWS, Dec. 21st, 1877, Nov. 27th, 1874.

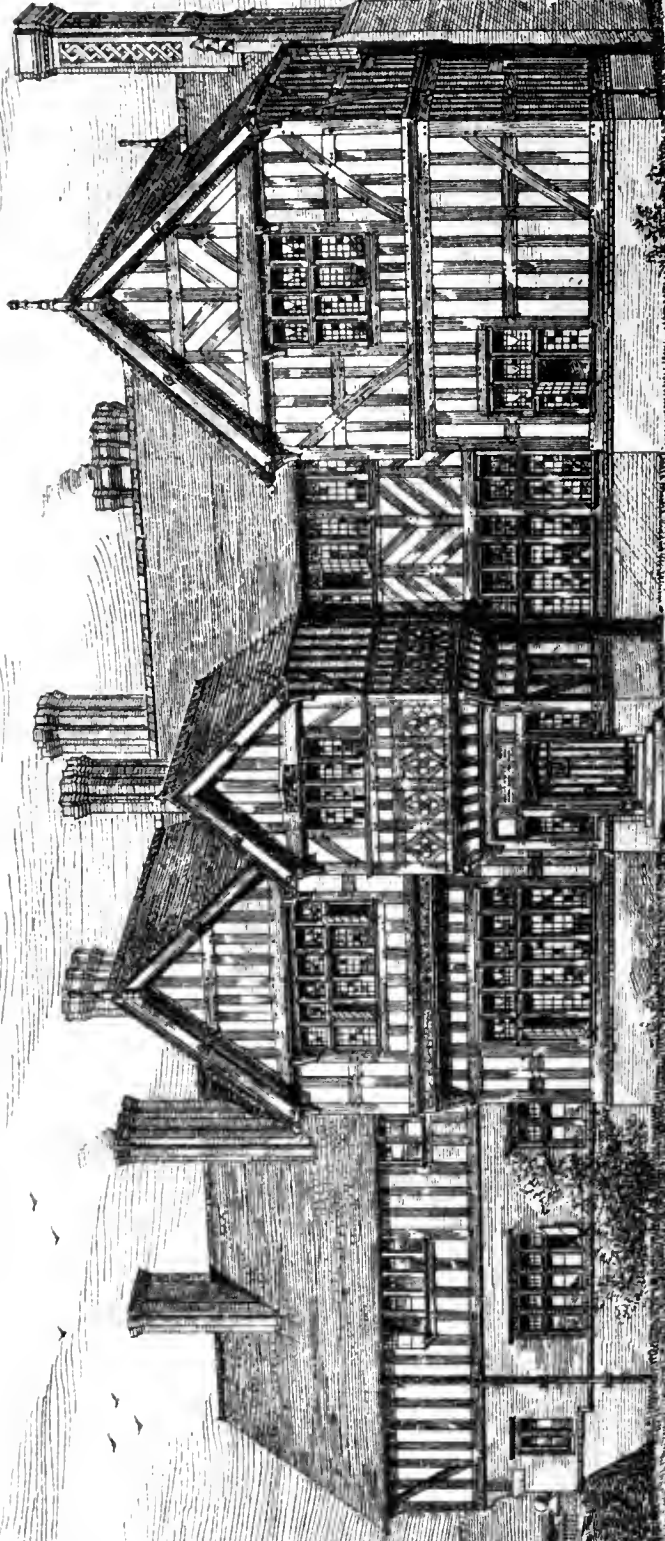


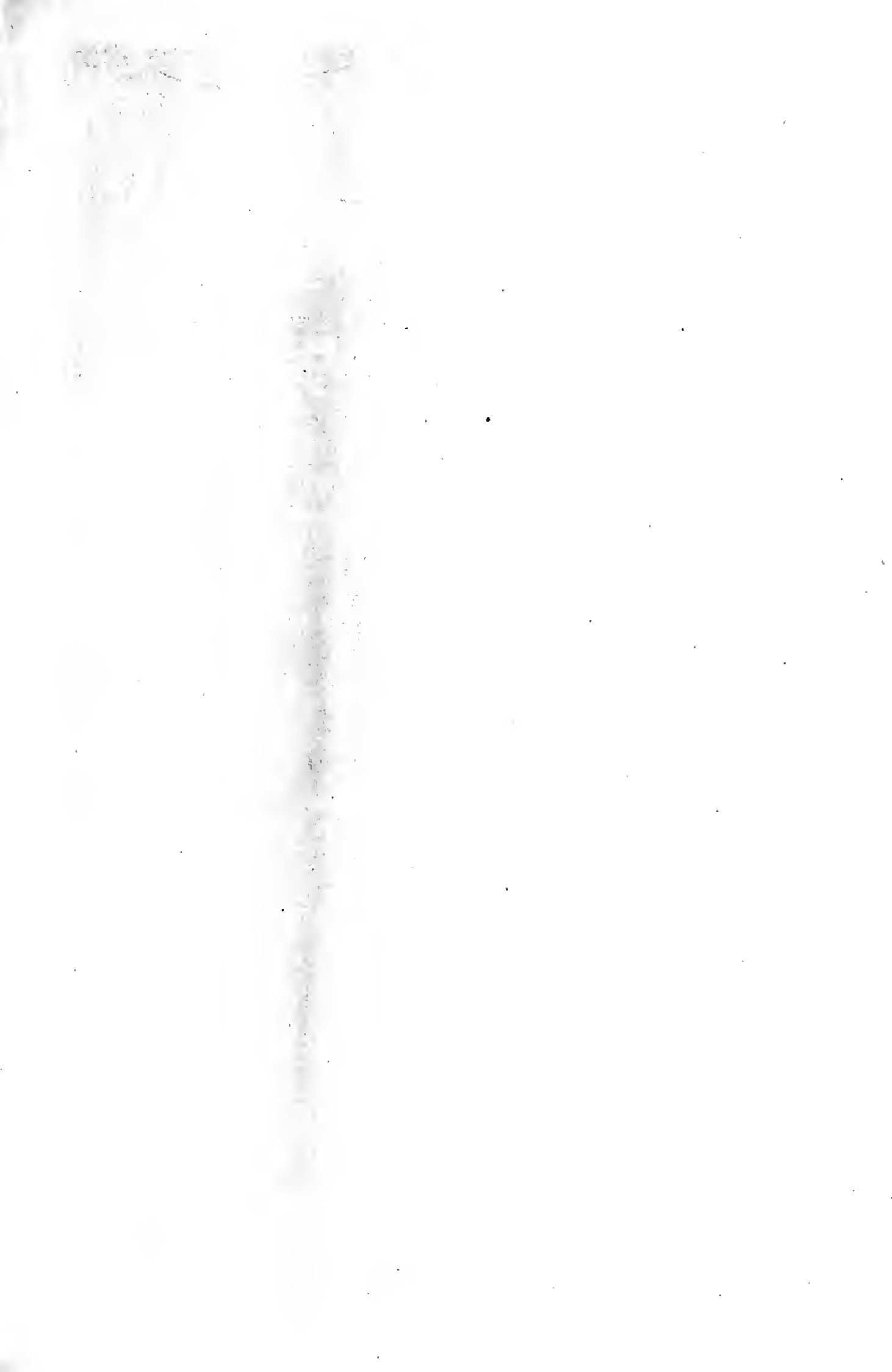
THE BUILDING NEWS, FEB 21, 1879.



Chamber plan.

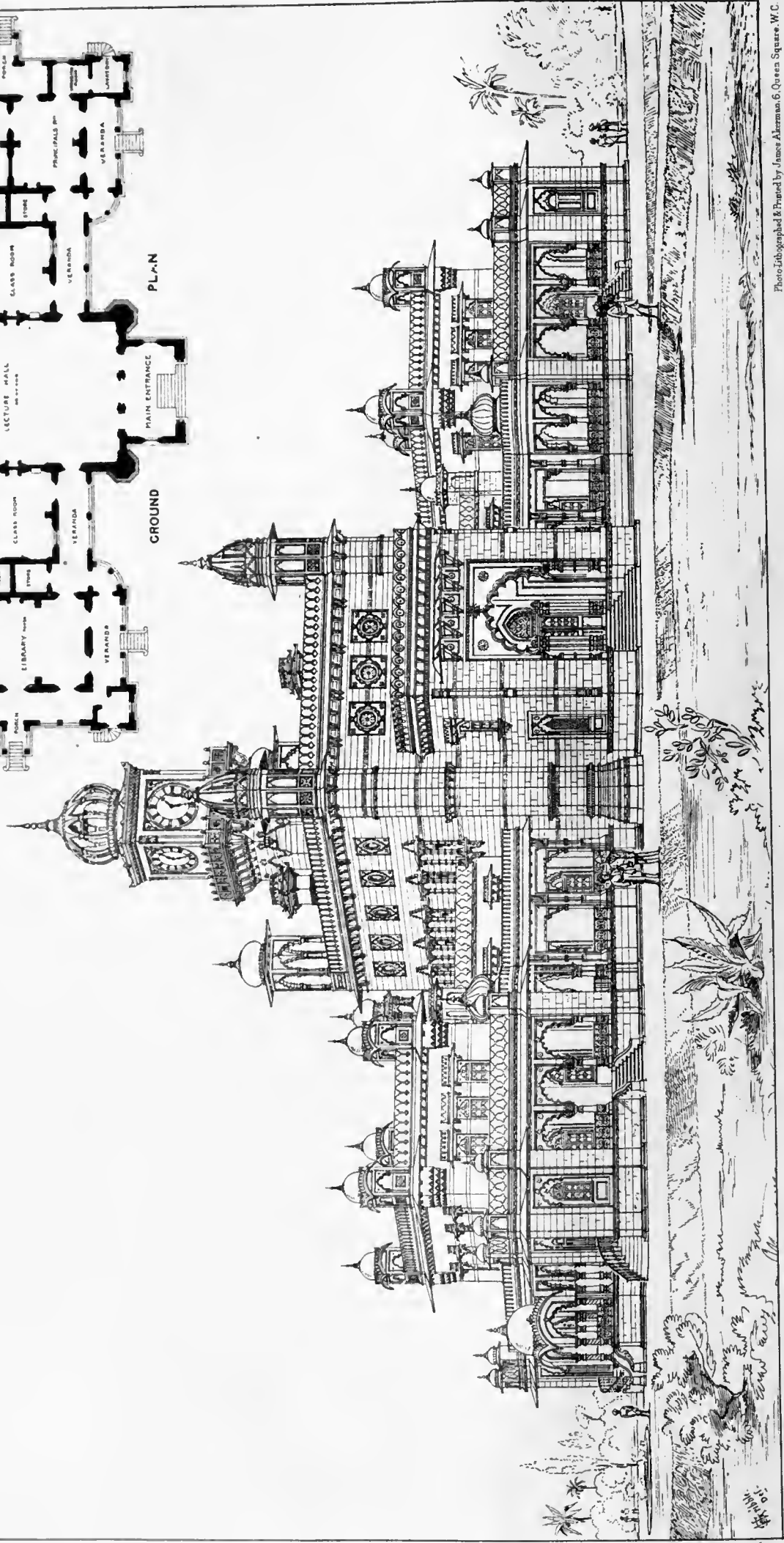
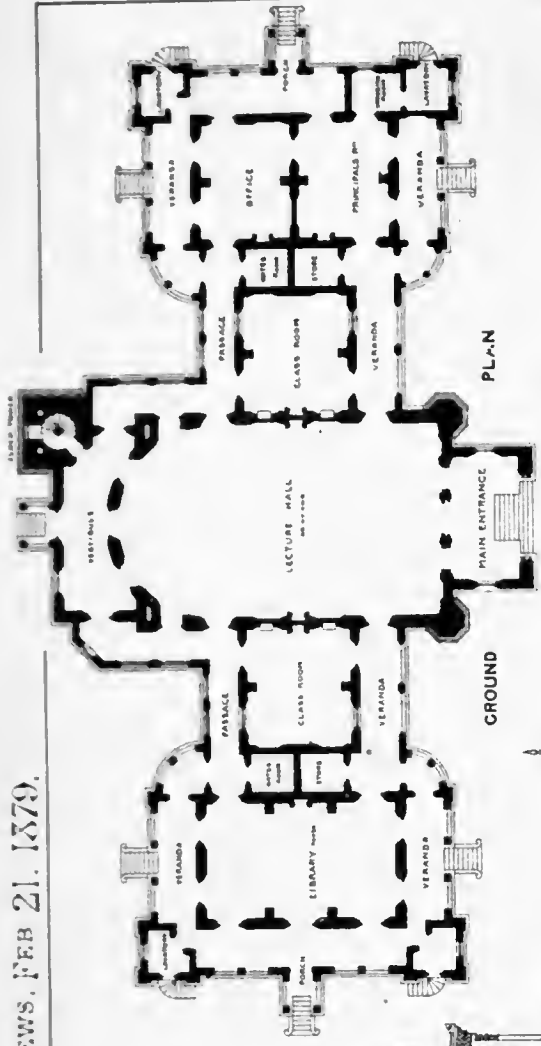
LLANERCH PANNA, NEAR ELLESMERE. Hon. GEO. T. KENYON
JOHN DOUGLAS, ARCHT





THE BUILDING DEWS, FEB 21, 1879.

MAYO COLLEGE. AJMER INDIA. MAJOR G. MANT. R. E. ARCHITECT.



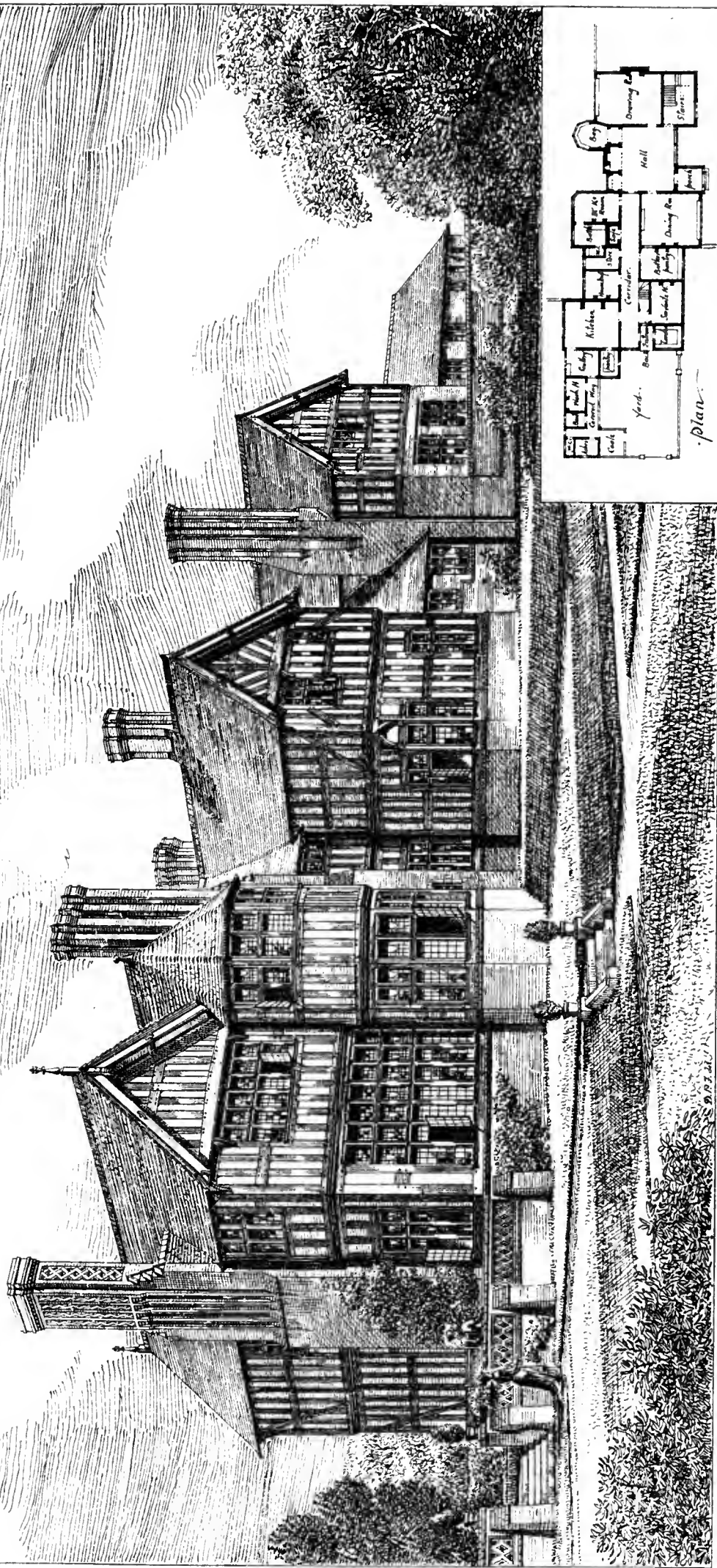
Condemned Churches in the City.

Church of SS. Anne & Agnes, Aldersgate Street.

APR 21 1965



LLANERCH PANNA, NEAR ELLESMERE. HON. GEO. T. KENYON
JOHN DOUGLAS, ARCHT



THE "BUILDING NEWS" DESIGNING CLUB.

REVIEW OF DESIGNS FOR GROUP OF THREE COTTAGES.

THE objects of good planning in cottages are obviously comprised under one word—"economy." The entrances should be contrived rather as internal lobbies than as conspicuous features; the stairs may be well made to occupy a portion of the space so set apart; the living-room should be easily accessible, of a good size for a man, wife, and three or four children, and in convenient proximity to the kitchen. There should be no waste passage room, unlighted corners, or unnecessary wall space. These conditions in the present competition seem met by "Yesram." The ground area occupied is about 54ft. by 23ft. exclusive of offices, and is well disposed. The end cottages have side lobbies with stairs slightly projecting, which lead into a front living-room, in each case 13ft. by 11ft., and into a kitchen 10ft. by 9ft., in which there is a pantry obtained under the stairs. The wash-house, oven fuel, and w.c. are desirably placed as a back projection. Above are two bedrooms. The centre cottage divided by straight party walls—a rather advantageous provision, we consider, sanitarily regarded—is, of course, different in plan. A front lobby with stairs gives access to a parlour in front, a living-room behind, out of which opens a small kitchen with sink at the back; beyond, separated by a space for light to kitchen, being the wash-house, and conveniences. Above are three bedrooms. There appears to be no waste space, and the author has certainly produced a compact group of dwellings, the main block of which is calculated at 23,302ft. cube, at 6d., and with the offices is estimated at £688. The elevation has the great merit of being simple and appropriate, relief being obtained by the tile hanging of the upper story and the timbering of gables. Motto "J." has some good points in plan. The lobby stairs and pantry are well combined in the end cottages, in a similar manner to the first; but there was no necessity for a parlour and living-room to each cottage. The living-room is made to answer for a kitchen in the end cottages, beyond which is a scullery with pantry. In the centre-house the scullery and conveniences are combined in a projecting back wing. The upper floor is commodious, three bedrooms being obtained to each cottage. The author, as usual, sends a picturesque elevation in which timber and plaster are used in the upper story, but the drawings are very crowded on the sheet. Estimate is £900. The plan of "Omnia Vineit Labor" is clever in the entrances, though the overlapping of the bedroom of middle cottage upon the kitchen of the end house is not desirable. All three cottages are differently arranged. The porches and stairs are compactly combined, and the kitchen and scullery lead out of the living-room in each case, but the stairs in centre are ill lighted. In the elevation we have a pleasing combination of brick and tile effective in the main. The cubing is put at 24,380ft. at 6d., £609. "Star in Circle" exhibits some good planning, the entrances at ends are compact, the ladder being placed under the stairs ventilated and lighted. The living-room, 14ft. by 10ft. 6in. is made to answer as a kitchen, and out of it opens a washhouse. The plans all vary. The elevations are in a neat and appropriate style, though the grouping at ends is not agreeable. The cubing is put at 33,186ft., and, priced at 6d., equals £829. The end cottages of "S in circle" are generally well planned in the entrance lobbies and stairs; in one case the washhouse is made to enter directly out of living-room, which serves as a kitchen as well. We do not like the narrow passage entrance to the centre house. The coals, ashes, and closets are placed in a row at the back, under a lean-to roof; this is perhaps unobjectionable in the country, but the coals would be better stored under the roof. The bedroom plan shows 4, 3, and 2 bedrooms respectively—a good arrangement, and the division walls are straight with a slight exception. The landings are lighted, and the closets are useful. Externally there is considerable variety obtained, as the end entrances are dissimilar, and in one case the upper story is made to project over the porch. We do not admire, however, the disjointed effect of the right-hand side cottage, caused chiefly by the roofing. The cubing is worked out at 24,984ft., and is priced at 6d., £641 16s. "Enigma" is certainly economic in plan, and the end cottages are replicas. The pantry would have been better

leading out of kitchen or living-room than wash-house, and there is rather a roundabout approach to the fuel store. The upper story is tiled. Estimate is £540, the cubing being 21,600ft. only. "Such a Dog" is the motto of two alternative sets. One design shows the group combined as a right angle, two cottages on one side and one cottage on the other. The porch entrances are somewhat circuitous in arrangement, but the washhouses are conveniently placed. We do not like the suggested position for the water-closets: they are certainly better outside; ash or earth closets are preferable. The alternative plan shows a back-to-back arrangement of two cottages, compact, but the stairs are ill-lighted. The elevations are simple and appropriate. "Spero Meliora" rather exceeds the requirements of country cottages; the lobbies are too large, and the parlour in one case is beyond the demands of the working man. Generally the plans are well studied, and the elevations are suitable. Estimate is £950. "Crowquill" also transcends the average cottage, and externally the design would be more suited to a suburb of a town. The end cottages are similar in arrangement of plan, and the front angles form canted bay windows, though for what purpose the heavy stone corbelling above is introduced we cannot imagine. The washhouses form a detached block in the rear. We do not see a coal store. The drawing is creditably executed, and the estimate is £704. "M in Leaves," like the previous two, falls into the error of providing larger rooms than desirable. The passage entrances are quite unnecessary for the working classes; they entail labour in cleaning and need a watch over the front doors. The author provides back covered yards for washing purposes, and reduces his scullery to a "wash up sink" out of kitchen. These are the best parts of plan. "T. W. P." sends a clever, but rather straggling plan. The entrance and stairs are placed opposite each other in each cottage, though irregularly distributed, and the rooms are located on each side of entrance, rather objectionable, inasmuch as it places one room beyond the control of the housewife, if she happens to be engaged in the kitchen or washhouse. The latter is made to form a single building detached from the cottage, and to be used jointly; the coals and w.c.s. are placed round the same outside block, a by no means desirable arrangement. The design of "W. J. M." is well drawn, but much too ornate in style for cottages. Such ornamental bracketed door canopies and the cross timbering are surely out of place in dwellings for agricultural labourers. The plan is more in keeping, but the broken party walls and the arrangement of centre staircase are defects. "Ieh Dien" is a neatly drawn set; but the remark we have already made about a passage access to the rooms applies to this. A large class of the designs we have received give us more than we asked for, though a few are creditable as drawings. Among these we place the design under motto "Be to its merits very kind, &c.," the author of which seems to have somewhat mistaken the object of these competitions, in contributing a set of elaborately figured plans, sections, and a full specification. To do him justice, we may say they are highly creditable as technical drawings; but we may repeat here, chiefly to save him useless labour, that the only drawings we need are those which illustrate the general scheme and design. The plan sent has one or two obvious defects. The entrances to end cottages lead directly into the living-rooms, and the central passage is defective. Why cant the corner? and what object is there in the huge corbelling of angle above door? The details show knowledge. Other designs creditable as drawings, in which the object of cottage design is lost sight of, are "Un Jeune Elève," "Olive Branch," "J. C." in circle, "To be, or not to be." "Club in circle" makes one washhouse answer for the three cottages; the end cottages are well arranged, but the elevations are too costly. "Leo" sends a simple plan, but with separate outbuildings; "J. S." has some good points, the elevation has a fussy look but is not without merit; "W. in Triangle" is bewildering in plan, and the party walls are crooked; and the same remark may be applied to plan by "Corvus," whose arrangement lacks contrivance. "L. in G." is suitable in treatment, but the out-offices are crowded, while "Montague" spoils a tolerable plan by attempting variety in his elevation. "Reseda" appears to have something in it, but the break in the centre cottage is unmeaning. We have no space left here to criticise other attempts, many showing misdirected labour and

some skill in drawing. We may name in order of merit "Burswell," "Yes or No," "Maltese Cross," "Revus," "Try," "Ostreich," "Tam O'Shanter," "X. L." "Steffano," "Spider," "Y. Saer Bach," "Thor," "G. in Shield," and "Ognore."

We cannot avoid here giving a few words of advice to many of the latter class. Study the grammar of planning, and never attempt an elevation until the plan is thoroughly worked out and reduced of all superfluities. We recommend, for the first, a perusal of an article which appeared in the *Building News* a year or two ago, besides an examination of good plans; and for the second, a strenuous exertion to bridle the fancy.

DESIGN FOR STONE PULPIT.

We are well aware that a stone pulpit is a difficult subject for design, as many architects err in the attempt; and lest any of our contributors should be disposed to quarrel with the award, we will just state what we consider to be axiomatic principles of design, and upon which we have based our selection. In the first place, to attempt to design a stone pulpit like a wooden one would be manifestly wrong. The outline and details must be essentially suited to masonry; the base should be massive, the ornamentation confined to moulding and relief, and attenuated tracery strictly avoided. Upon these principles then, we consider motto "J" has arrived at a fair solution. The design is Classic in conception. The pulpit is built up from the floor rectangular in plan, while the side, front, and ramp of stair is simply jointed ashlar of Ketton stone, relieved by a moulded cornice with egg and tongue enrichment as a capping and book rest, and a carved sunken panel beneath. Inside, the pulpit is lined with oak panelling. Next in merit comes "Triangle in Circle." Here a little more freedom has been displayed, the square front of pulpit being broken by a circular corbelled projection, quite plain; the only relief being carved diaper ornament up the sides and round the base of projection. The style is Gothic, and the detail is effective, though the drawing is poor. The author of the third best design, "K in Circle," has, by mistake, sent a font for a pulpit—an error that, of course, excludes him, and we only mention his design as conforming to correct notions of design. "Bad Attempt" is certainly rough in drawing, but the design is not wanting in simplicity and character. The author supports a circular pulpit upon a massive central shaft, surrounding which are three smaller shafts with caps and bases. We do not like the sunken panel and cross, though the details are good. "Signum" is perhaps next in merit. The pulpit is constructed on a square base of ashlar, the front of which is made to project on angle shafts. "Nemo in Shield" is a plain circular pulpit standing on a massive stem; the ornamentation is appropriate, with the exception of the capping, the metal scroll work, and the newel of balustrade. "Burswell" adopts a square form, suitable but for the panelling. The elevation looks octagonal from improper shading. "Prenez garde" is much too florid, and the details are somewhat coarse, especially the base mouldings. Another class of designers have adopted the framework idea too much; "East Anglian" is one of the best of these; "Try" is another, but fails in his mouldings; "Namor" has the germ of success, but the base with its huge scotia and the mouldings destroy an otherwise reasonable design; "Dunwich" attempts too much; there is something good in the idea, but the details are extravagant. The corbelled base is spoilt by the puny and crooked angle shafts in a very unnatural position, and the inter-penetration of the angle pillars is absurd. "Amateur" is too bombastic, and there is a useless display of ornament. It would be throwing words away to criticise a design which makes the final of a centre arch a book rest. "Try" endeavours to be too ingenious; the plan is capricious. We can only name "Fleur de Lis," "Con Amore," "B. M. W.," "Be to its merits, &c." Many of these are far too elaborate and costly for a country church pulpit.

At Burton-on-Trent county-court, on the 5th inst., a case was heard in which J. A. Mason, architect, claimed £15 for plan of building prepared and supplied to a Mr. Christian. The defence set up was that the designs were too expensive, and were never used, and the judge (Mr. Woodford) gave judgment for plaintiff for £3.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

(Concluded from p. 185.)

THE author further urged, that not only were these matters of arrangements of approaches and general appearance thought out, but that the given points of sight and the apparent magnitudes were the subjects of consideration; and calculations were made in order that the designs should appear to the spectators as perfect in apparent proportions as they were first conceived in the architect's mind. The idea of a point of sight was not, he admitted, new; but that the Greeks should have corrected all the apparent vertical magnitudes, so that in the finished design they should all be commensurable one with another and with the apparent whole height, and then have trigonometrically calculated and corrected all the executed heights in the finished design to suit a favourable given point of view, required actual proof. The evidence was based, firstly, upon the written statements of Plato, Aristotle, and Vitruvius, who all clearly referred to a favourable point of view, to the apparent magnitudes, and to the corrections made in the original design by certain "additions and diminutions." Secondly, the measurements of the Athenian porticoes showed clearly that certain small plus and minus quantities had been either added to or taken from the original dimensions of the porticoes, as given in the canon of proportion. Thirdly, by simple trigonometrical calculations commencing with the given quantities, the true executed dimensions might be arrived at, which in every case would agree with the measurements. To establish the first point, a number of corroborative passages were quoted from the three authors named. But we need not trust to the correct interpretation of these passages, for if such "additions and diminutions" were really made upon the original designs when designing, we must expect—upon examination of all architectural works of magnitude executed, either in Greece or in Asia Minor, during the best period of Greek art,—to be able to discover by measurement the actual amount of the variations made in the heights of the several members of each design when subjected to those corrections essential to produce apparent harmony between all the parts of the finished executed design; and this was, he urged, really the case. Sufficient space was allowed for the eye to embrace the line of greatest extent (usually the diagonal line of the temple) within a given horizontal visual angle of 45° , and this horizontal angle of 45° was dealt with as a fixed quantity. Vitruvius refers to the special calculations required for determining the apparent magnitudes, and the additions and diminutions that have to be made, but before this could be done certain quantities must be given. Firstly, this is done for the Greek porticoes when the first given heights, widths, and projections are all laid down according to a fixed canon of proportion. Secondly, upon the horizontal plane—"the plan exhibiting the length and breadth of the whole work, and the several parts of it, must be formed," and the position of the point of sight must also be given upon this plane, "so as to comprise the whole extent of that scale which the eye is able to embrace at one view." Thirdly, the position of each design upon its artificial platform with regard to the point of sight and the height of the upper step either above or below the horizontal plane must be also given. The temple is now supposed to be fixed in position with regard to the point of sight—the given dimensions are all commensurable, and if there were no corrections to be made we might at once proceed with the designing of the columns and the entablatures. This is actually the case in some small designs, but not in the Greek works of magnitude. In these cases certain corrections have to be made by calculation, so that the perspective design may appear to the spectator to be perfect in apparent proportion, and the slight irregularities were thrown into the executed work, where they escaped detection. The horizontal straight lines have also to be converted into convex lines. Speaking generally, the calculations for determining the apparent magnitudes are found to assume a twofold character; firstly, position, and, secondly, the executed dimensions. This was fully explained by reference to diagrams representing the Parthenon, and it was shown that all positions were rendered commensurable with the given canon of proportions, and that the apparent dimensions were

made commensurable by substituting for the apparent irrational quantities the nearest angular magnitudes, and the slight irregularities were finally thrown by calculation into the executed height, so as to cause perfect harmony between all the apparent proportions. The second important correction that the Greeks made upon the masses of their architectural designs was the substitution of curved lines in their larger works of architecture, instead of the horizontal straight lines. The first accurate study of these curved horizontal lines was made by Mr. Penrose, who visited Athens in 1846, and measured and observed them with scientific skill. He measured the curvature of the lines in the sub-basement of the first temple of Minerva in the Acropolis (built about the 8th century, B.C.) as follows:—Length of the front 104.2ft., amount of curvature in vertical plane at centre 0.15ft.; length of flank 221.0ft., curvature in vertical plane at centre 0.233ft. This is probably the oldest existing example of the curvature of the horizontal lines of Greek architecture. But the principal development of these curved lines is in the designs of the age of Pericles, and of all the horizontal curves now remaining, the best preserved and the most carefully executed will be found to be in the upper step of the Parthenon. When speaking of the curve of the upper step at the east end, Mr. Penrose says, "A circle drawn so as to pass as near as possible to all the measured points, taking them in their actual positions, would be subject to an error of only .0065ft." The agreement is evidently so close between the measured and the calculated ordinates, for all four sides of the Parthenon, that we may safely identify them as the arcs of similar circles. The entablature of the Parthenon has as it stands certainly a curvature in a horizontal as well as in a vertical plane, but the former curvature appears to have resulted from the concussions which have so seriously shaken the building, and not from design. The columns are of exactly the same length, so that the curve of the entablature follows that of the upper step. The second part of Mr. Pennethorne's paper dealt with the working out of these general principles, in the column and entablature, and the minor details of the buildings. Here a new feature had to be introduced, the application of the conic sections to the outlining of the mouldings, ornaments, capitals, and all details of Greek art, and although there is no written work upon the conic sections earlier than Apollonius, B.C. 240, yet traces of these curves are found in all the marble remains of the Greek temples, and there was reason to believe also, in the outlines of some Egyptian cornices, and shafts of columns. In the designing of the Greek entablatures there are no corrections to be considered, but the whole entablature from the first is perspective proportioned, and arranged to suit the given point of sight; and this is the case in the designing of all the entablatures, whether in Athens or Rome. Dividing the whole apparent height into some given number of aliquot parts, the apparent height of the architrave, of the frieze, and of the cornice will in each case be a multiple of this given modulus. Again by dividing the first modulus into a given number of apparent aliquot parts a second modulus is obtained by which the apparent heights of all details of cornice, of architrave, and of frieze will be regulated, and the true lineal heights are then all determined by trigonometrical calculations. In Greece the curved outlines of the ornaments are generally traced upon curved surfaces, which become the mouldings of Greek architecture. From direct observation we find that the curved profiles of the mouldings can be reduced into the arcs of a few simple mathematical curves, and can then be classed according to the number of curves combining to form the profile. The sections through the fascie are frequently curved surfaces, the section being either elliptical or hyperbolic, and the sections through the soffits of the cornices are also the arcs of conic sections, either of the hyperbola, of the parabola, or of the ellipse. The designing of the ornaments is complex, owing to the multiplication of the curves one within another, but when a single outline is taken, the curve is found to be simply the arc of one or other of the conic sections, easily traced by descriptive geometry from the given elements of the several curves. The first ideas of the Egyptian columns were, Mr. Pennethorne believed, derived from the artistically-arranged offerings painted in the tombs, and on the temple walls. The Grecian Doric columns and entablatures were suggested

by those earlier Egyptian designs; but the Egyptian architects were guided in the design of the columns by the laws of proportion, and a knowledge of geometry. Between the designs of the Egyptian and the Greek columns are many points of very close resemblance, sufficient to prove that the first ideas of the Doric columns and the first principles of Greek art were both derived from Egypt. But in Greece we lose all trace of nature in the designs, and the columns, as well as the ornaments, are purely intellectual works of geometry, dependent for their beauty upon accurate proportions, upon true mathematical curves, upon a careful study of light and shadow, as well as colour, and, lastly, upon great precision in the execution of every detail. Athenian architects appear to have adopted a certain canon of proportion, both for the Doric and for the Ionic columns, thus—In the Doric

order the width of the abacus = $\frac{\text{height of column.}}{5}$
This is the case in the Parthenon, in the Temple of Theseus, in the Propylaea, north wing, and in the temple of Apollo at Phigalia. In the Ionic

order the width of the abacus = $\frac{\text{height of column.}}{8}$
This is the case in the three examples of the Erechtheum, and in the Ionic temple of the Ilissus and at Priene. The first masses of the columns being arranged, then the width of the abacus is always divided into some given number of aliquot parts, as 14, 15, 16, &c., and one of these parts being taken as a modulus, then the upper and lower diameters of the columns, and in the Ionic order the height and width of the capital and of the base are made multiples of this modulus. All the details of the columns, as well as of the entablatures and ornaments, were invariably proportioned in aliquot parts. The Greek architects made a finished coloured drawing of the whole design, taken from some angular point of view, and showing the sculpture, painting, and architecture all combined; this was known as the *Scenograph*. It would, however, require the artist feeling of a Raphael or of a Claude to reproduce copies of these original drawings of the Greek artists, but the materials exist in the remains of the sculpture, of the painting, and of the architecture, and in the position of the Acropolis itself in the plane of Athens.

LEGAL INTELLIGENCE.

CONSEQUENTIAL DAMAGE.—Mr. Under-Sheriff Birchell, on Monday, presided over a special jury at the Middlesex Sheriffs' Court in the case of "Fitzwilliam and Hall v. the London School Board," in which a peculiar question arose as to "consequential damage" to the Hall-park Estate, Paddington, by the London School Board taking two houses in Campbell-street for a school. Mr. Grantham, Q.C., and Mr. Anderson were for the claimants; Mr. Marriott, Q.C., and Mr. Freeman for the School Board. The sum of £462 7s. was agreed upon as to the houses, and the principal question was the damage to the rest of the estate by the severance. The evidence on the point was most conflicting. The surveyors for the claimants estimated the damage at £1,000, and described all schools as a nuisance to property, except of the lowest description. On the part of the School Board, several surveyors stated that so far from damage being done to the property by the school a benefit would be conferred on it. The neighbourhood was inhabited by artisans, and schools in such places did not injure property. One of the witnesses, however, admitted that to take two houses from an estate and thereby introduce a "foreign owner" was an injury. The jury, after a brief consultation, gave £424 for the severance, which, with the value of the houses, made the verdict of £886 7s.

WATER SUPPLY AND SANITARY MATTERS.

LILEBY, LEICESTERSHIRE.—The usual local inquiry for sanction to borrow £3,500 for drainage works for this township has been recently held before Major Tulloch, R.E., upon plans prepared by Messrs. Hodson, Price, and Hodson, of Loughborough. It is intended to provide sewers for all the streets, and the whole sewage of the three water-sheds of the township is brought to one point of outfall, where it is to be dealt with by irrigation over 3 acres of land. The only unusual feature of the scheme is that the proposed outfall ground is practically level, the greatest difference in level being only 0.4 of a foot.

Building Intelligence.

ARMY AND NAVY CLUB.—The Army and Navy Club, which has been closed since the 12th August last for extensive alteration and entire redecoration, from the designs and under direction of Mr. Hugh Roumieu Gough, of 6, Queen Anne's-gate, S.W., was reopened on the 17th of February. The principal alterations consist in the enlargement of lower smoking-room, by the addition of a corridor and of the former visitors' dining-room, making the area of new room 2,620ft., probably larger than the smoking room of any other club in London. The ceiling of the new portions of the room, as well as that of the visitors' new dining-room and new billiard-room, are very richly treated, and have been carried out in carton-pierre. One of the principal features of this building is its noble hall and grand staircase, occupying an area of 1250ft.; in this portion only has gilding been used, the iron balustrades being etched with gold on a "café au lait" ground. The general repairs and renewal of furniture were entrusted to Messrs. Holland and Son. The total cost of the works has been about £12,000. The bills of quantities for the builders' and decorators' work were supplied by Mr. Wm. Allport. Mr. Crawford Eyre acted as clerk of works.

BRISTOL.—The formal opening of the new Grammar School, Tyndall's Park, will take place after Easter. The style is that of the fourteenth century. The dimensions of the ground line are 158 feet by 68 feet, and the height to the terminals of the gables is 90 feet. The building is of red local stone, with freestone dressings. The ground-floor of the main building is divided by corridors, opening upon which are the cloak-rooms, the head master's rooms, and eight classrooms, each averaging 20 feet square. From the entrance a corridor leads to the western transept, where the principal staircase of Pennant steps and freestone balustrade leads to the upper floor, the whole of which is devoted to the large schoolroom, 140 feet long, 50 feet broad clear of the walls, and 50 feet high from the floor to the collar beam of the roof. The seats and desks provide accommodation for between 400 and 500 boys. The pointed roof is covered with green slate, and surmounted with terra cotta cresting. The clock has been supplied by Messrs. Gillett and Bland, of Croydon. The total cost of the building, including the site, will be nearly £20,000. The clerk of the works is Mr. George Salmon; the general contractors, Messrs. Williams and Sons. The gaseliers and pendants were supplied by Hardman & Co. The designs were furnished by Messrs. Foster and Wood.

CRICKSEA.—The parish church of Cricksea, in the Dengie Hundred, South Essex, was reopened on Sunday week, after having been entirely rebuilt upon the same site. The new church consists of nave, 36ft. by 19ft., with south porch and a chancel 20ft. by 16ft., with north vestry. As much of the old materials has been used as possible. The nave roof is open-timbered and tiled; and the west end is surmounted by a bell turret constructed of oak, and hung with oak shingle. The south doorway was the only architectural feature of the old church which could be re-used; it is of the Early Decorated period, and has been adopted as a key for the style of the restored church; the old stone doorway has been protected by a massive porch in oak. The chancel roof is close boarded with moulded ribs, and carved stones at the intersections. The furniture consists of Caen stone pulpit, stone credence-table, desk, lectern, and benches of carved wood. In front of the altar is an inscription in encaustic tiles, "Do this in remembrance of Me." The works in the nave have been carried out by Mr. Charles Read, of Burnham, Essex; and those in the chancel and vestry by Mr. J. M. Hayes, of Maldon. Mr. F. Chancellor, of London and Chelmsford, was the architect. The total outlay has been about £1,350.

DUBLIN.—New and extensive buildings are being erected at the terminus of the Great Northern of Ireland Railway Company in Amiens-street, Dublin, and are nearly completed. They are built of Belfast red brick and Dunfries stone. In the basement are the stationery department and the strong rooms. The board-room opens on the departure platform, and has an open roof and sunlights. Adjoining

are a new station-master's office, three waiting-rooms, lavatories, and lamp-rooms. On the second floor are a committee-room and secretary's, accountant's, engineer's, and traffic manager's rooms. The buildings have been erected under contract by Messrs. Fitzpatrick, Belfast, from the designs of Mr. Lanyon, of the same city, architect; the outlay has been about £16,000. The mantel-pieces, heating apparatus, plumbing, and gas-fitting were executed by Messrs. Hodges, of Dublin.

GUISBOROUGH SCHOOL BOARD.—In a résumé of their work during the last three years, the retiring Board state that they have carried out the Elementary Education Act to the best of their ability, with the restricted means at their command, and that towards providing proper school accommodation, they have effected the transfer from the Charity Commissioners to themselves of the Providence Schools, which represent property and securities to the value of upwards of £5,000. Of this sum £3,000 has been devoted to the erection of the new Providence Schools. The new Providence Schools provide accommodation for 789 children, with suitable teachers' residences adjoining, and are now almost completed and ready for occupation; and the Board state that they feel it due to their architect, Mr. J. Mitchell Bottomley, of 1, Zetland-road, Middlesbro'-on-Tees, to say that they believe that both for beauty of design and for practical convenience and comfort, these schools can compare favourably with any with which they are acquainted. The cost, inclusive of site, is £7,562, and the contractors for the whole of the work are Messrs. Sturdy Bros., of Middlesbro'. The Board state that their architect has prepared plans for the Northgate Schools, also providing accommodation for 789 children, but, owing to the depression in trade and other causes, they have proceeded with only the boys' and infants' departments, leaving the girls' school and the teachers' dwellings to be completed when a revival of trade and experience of the practical working of the existing schools may demonstrate the necessity for this. The contract for the Northgate Schools has been let to Mr. Richard Cass, of Guisbrough, for £3,285, and the site has been given by Admiral Chaloner.

HULL.—The first block of school buildings erected by the Cottingham School Board were formally opened on the 5th inst. They are intended to accommodate 300 children. The buildings are erected of brick with stone dressings, a conspicuous feature being a tower and spire containing the bell over the infants' entrance. The roofs are open-timbered, of pitch-pine, stained and varnished; and the lavatories, which have the walls lined with white glazed bricks, are fitted with Macfarlane's washing apparatus. The total cost of the buildings—which are of a substantial character—including the pavement, gas and other fittings, payment to clerk of works and every expense, will amount to £8 13s. 4d. per head. Mr. Robt. Clamp, of Hull, is the architect, and the works have been satisfactorily carried out by Mr. Mark Helas, the builder.

LIVERPOOL.—The Liverpool Reform Club was opened on the 6th inst. Granite, about 6ft. high, forms the base of the building, above which rises the main walling of Ruabon bricks, relieved here and there by Woolton red stone in the dressings. From the entrance hall the first or principal floor is approached by the grand staircase. On the right there is the reading-room, about 40ft. long and 27ft. wide. The remaining portion of this floor is principally occupied by the large dining or coffee-room, about 87ft. long and 27ft. wide. Continuing up the grand staircase, the smaller dining-rooms, smoke-room and billiard-room are reached, all on the second floor. The general contractors were Messrs. Jones and Sons, Liverpool. Messrs. Gillow and Co., Liverpool, supplied the furniture, and Messrs. Hardman and Co., Birmingham, the gas fittings and ornamental ironwork. Mr. Thos. Dove was the clerk of works. The building has been erected and the furniture supplied under the superintendence of the architect, Mr. Edmund Kirby, of Liverpool.

MANCHESTER.—St. John's Church, Deansgate, Manchester, was reopened on Feb. 13th, after restoration. An inner chancel, or "chorus cantorum," has been formed within the existing walls. The altar is of oak, open framed, and has been manufactured by Messrs. Cox and Sons, of London. Above the oak panelling

the walls of the sanctuary are decorated in colour and gold, with a banded diaper and four vesica-shaped panels. The plaster-groined ceiling of the apse is also decorated in colour and gold, and is powdered with stars. The work has been executed from the designs of the architects (Messrs. Medland and Henry Taylor) by the contractor, Mr. T. Scott.

METROPOLITAN BOARD OF WORKS.—At this board regulations prepared under the 12th section of the Metropolitan Management and Building Acts Amendment Act, 1878, with respect to the protection from fire of new theatres and certain new music halls, have been submitted to the Building Act committee; they were referred back to the committee with authority to send the same to the Lord Chamberlain and the justices of the peace for the City of London and the counties of Middlesex, Kent, and Surrey, with the view of obtaining their opinion thereon before they are finally settled and approved by the board. A letter was received from the Baroness Burdett Coutts, offering facilities for the removal of the Whitechapel hay and straw market from its present position in the High-street to her Columbia-market in the Hackney-road.

STAVERTON.—The chancel of the parish church of Staverton, near Totnes, has been restored, under the superintendence and from the designs of Mr. Ewan Christian. The roof, quite new, is of the local waggon shape, and of pitch-pine. Its timbers are decorated by colour, the ribs and purlins painted, and the carved bosses at the intersections gilded. Over the chancel proper the panelled boarding is varnished only, but within the sanctuary the ground is of blue, spangled with golden stars. The roof springs from wall-plates, in which are carved paterae, and at the western end spring corbels of stone, upon which are sculptured representations of angels in attitudes of adoration. The floors are laid with Minton's encaustic tiles; and by four steps of Robin Hood stone the ascent is made to the altar. The walls of the chancel are plastered and stuccoed a quiet colour. The reredos is in the main of moulded and carved stone, having a central compartment of wood highly decorated. The stone and wood carving and sculpture have been executed by Mr. Harry Hems, of Exeter; and Mr. Cudleigh, of Newton Abbot, is the contractor for the restoration generally.

TWEEKSBURY ABBEY.—At the last meeting of the restoration committee a plan prepared by the architect, Mr. J. Oldrid Scott, was exhibited, showing the proposed position of the large organ in the centre of the tower arch to the north transept, was produced and approved, and Mr. Willis's specification and estimate (£700) were accepted for the rebuilding of the organ, which was originally purchased for Magdalen College, Oxford, in 1637, and removed to Tewkesbury Abbey exactly a century later. A vote of thanks was proposed to Mrs. H. B. Moore, who has undertaken the restoration of the font and to provide for it a canopy. Plans of the choir stalls were also produced, and it was decided to proceed with those for the north side, leaving those on the south until further funds are obtained.

WARNEFORD DIOCESAN CHARITIES.—The following grants towards the erection, enlargement, and restoration of churches in the ancient diocese of Gloucester, were voted by the Warneford Ecclesiastical Trustees at their last meeting:—Bledington (additional) £100; St. James's, Gloucester, £250; Iron Acton, £100; Moreton Valance, £100; Northleach (additional) £150; Sutton-under-Brails (additional), £50; Tewkesbury (additional), £100; and Upleadon, £25; and towards the erection, repair, and alteration of parsonage houses:—Beachley, £50; Coaley, £100; Little Compton, £10; Minsterworth, £75; and Stone, £25.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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A COUNTRY STUDENT. (There is no such work as you require upon architectural drawing and shading, published in England, and the only work on shading of a practical kind we can recommend is Gwilt's "Sciography; or Examples of Shadows, and rules for their projection," published in 1834. If you want to learn the names of details of buildings, you must consult Parker's Glossary, Gwilt's Encyclopedia, or other work of an elementary kind, for which you appear to have such a contempt.)—H. J. PEARSON. (We cannot recommend you any work on prize drawings for cottages. "Cottage Construction and Design," by C. W. Strickland, published in 1864, and another work, "Hints on Cottage Architecture," by H. Weaver, may be of service.)

M. REED. (We cannot say. We have never had any other complaints, but we cannot guarantee the integrity of advertisers.)—E. A. P. (The plates are not sold separately.)—EXETER. (Many methods have been advised in back numbers. We believe the damp proof composition sold by the Silicate Paint Co. is an effectual remedy.)—J. KAYE AND CO. (We do not insert copies of letters sent to other journals.)

"BUILDING NEWS" DESIGNING CLUB.

B. M. W.—(We cannot account for the omission, and we now supply the criticism of the buffet. The general idea is not without merit; but the top ramps and side shelves spoil the outline, and the carved brackets on each side of mirrors are quite out of keeping with the end supports to the cove. We should have liked the design better if the ramps had been omitted.)

Correspondence.

THE ORIGIN OF THE SCOTTISH BROCHS.

To the Editor of the BUILDING NEWS.

SIR,—When I read in Mr. Fergusson's paper on the Brochs, the following catching sentence, viz., that "the great tendency of controversies of this kind is to get smothered in detail, and to such an extent as to obscure the main facts at issue," I knew some unwary critic would swallow the tempting bait, nor on perusing your article on the subject was I mistaken. The fact is that it is details and details alone that must decide the matter, for it is the character of the objects found in excavations in the brochs that must determine their origin and use, all else being simply speculation. Now, the objects found belong almost exclusively to the late Celtic and not to the Viking period, as anyone who chooses to examine the collections in the Museum of the Soc. Ant. Scot. may see for himself. This is the unpleasant objection to the Norwegian theory, which Mr. Fergusson makes no attempt to answer, and for an obvious reason—that it is unanswerable. Mr. Anderson is a practical working archaeologist who has examined and excavated a very large number of these structures himself, and is also curator of the Museum of National Antiquities of Scotland, and his opinion is consequently entitled to much more weight than that

of Mr. Fergusson, who as far as the brochs are concerned, is merely an amateur.—I am, &c.,
J. ROMILLY ALLEN, F.S.A. Scot.
23, East Maitland-street, Edinburgh.

CLERICAL DRESS IN 1750.

SIR,—As a sequel to my last letter, I may add that, having personally seen the interesting figure which Mr. Harry Hems had discovered, we are now agreed that it represents the Poor Man of Pinhoe standing appropriately on the top of an alms-box in the church, as I suggested. The date is, I think, the beginning of the last century.—I am, &c.,
MACKENZIE E. C. WALCOTT.

SEMI-DETACHED VILLAS.

SIR,—I was glad to see further attention called to the problems connected with semi-detached villas in your last number, a question which is of so much importance to a large section of the dwellers in towns and suburbs.

Having had some little experience in carrying out buildings of this class, I may, perhaps, be allowed to add a few remarks to those of Mr. Stedman. The good points in the plans of "S. in Circle" (illustrated in Jan. 31), are the provision of a lavatory out of the hall (a w.e. on the ground-floor is, I think, quite unnecessary in this class of house), the shutting off of the kitchen and offices and the garden entrance, though this latter feature cannot be considered needful, the dining-room window being a French encaissement.

The faults, I take it, are—the excessive projection of the kitchen and offices, which seem to make a strenuous endeavour to reach the bottom of the garden—and what appears to be the intentional blocking up of the through entrance to garden by the coals. The stairs are very cramped indeed. The kitchen window commands a great part of the dining-room. I hold with Mr. Stedman that the kitchen and scullery windows should be on the side where there must always be a high fence for the depth of the house, and on no account should either of these windows overlook the garden. There is some amount of waste space in the roof. The lowest price which can be generally reckoned near London for this class of property is 7d. per foot cube.

By the way, is not £800 cost rather too much for a semi-detached villa with only two reception-rooms?

If the kitchen is put by the side of the dining-room and the hall and stairs in front of it, with the entrance door in the front wall (leaving only the scullery and offices to be built out in one story), the house becomes square, and may be covered with a simple one-span roof. On first-floor there would be three bedrooms and bathroom, and separate w.e. over hall, with three attics and eistern or box-room in the roof. The depth of house being 33ft. and the width 26ft.

I have found the foregoing to work both economically and conveniently, costing about £1,400 a pair. I may add that by making the house 2 or 3ft. deeper and getting the main entrance on the side, a small library may be got next the drawing-room in front.—I am, &c.,
Feb. 10.

M. C. H.

ARTISTIC BLOWERS TO OPEN FIRE-PLACES.

SIR,—I see in the interior view of the Dining-room, Finchley-road, published in the BUILDING NEWS of to-day, a sort of dog grate is used with an open fireplace, and that the very necessary feature of an ornamental blower is introduced. Now that so many of us live in Queen Anne houses—or at any rate in houses where these admirable grates generally known as slow combustion stoves are used, having large openings over—the necessity of a blower is very much felt, and its treatment architecturally is worthy of consideration. I must say I have not yet seen it well treated in any modern Queen Anne building, while in a great many the tiles round the grates bear witness to the smoke which the inmates enjoy at times. For instance, when I went over the new School Board Offices on the Thames Embankment soon after they were opened, the tiles to the grates in nearly all the rooms were well blackened, and brown paper blowers were used. I wonder how they work now! This is probably not, strictly speaking, a Queen Anne building, but it comes under the same class, perhaps better termed "Free Classic." But if the smoke makes free in these Classical houses, so it does in the severe Gothic ones, and it is to one of the most severe, and I may say beautiful, modern examples

lately built that I think we must turn for a lesson in the artistic treatment of blowers. I refer to Mr. William Burges' house at Holland-park, Kensington. Here in the library, as in all the principal rooms, hooded mantels over open fireplaces with dog grates are employed. All these hoods are most beautifully carved and delicately painted in gold and colours so that the least escape of smoke would at once spoil much of the elaborate decorations. Fortunately, before any damage was done effective means were taken to prevent the escape of smoke by the insertion of a blower, which consists simply of a piece of plate glass some six or eight inches deep, and supported by an iron bar on the lower edge. This has the advantage of not obscuring the fire and yet preserves all the advantages of an ordinary blower. I think Mr. Burges' practical idea is worthy of imitation, even by those who, like myself, are tainted with a love for the style called Queen Anne for one's fireside.—I am, &c.,
Feb. 7, 1879.

AN OLD TEE SQUARE.

THE METHLEY SCHOOL BOARD v. GOUGH AND PATTINSON.

SIR,—As your report of the above action, probably drawn from a local source where feeling would not unnaturally be with the board, is calculated not only to prove injurious to me, but also to be a serious annoyance to other gentlemen in the profession bearing the same name, I should feel obliged if you would, in justice to them as well as to myself, allow me to make a few remarks. In the first place, I would state that the schools were completed in April, 1877, and the Board were so well satisfied with them, that they paid the contractors half the balance due at two months after the completion instead of four months as arranged in the contract. Some time after completion, I sent in my account, and for a long time no notice whatever was taken of it. After a period of about three months, I heard that the Board considered 5 per cent. should cover all charges; to this I demurred, showing them that no such arrangement was ever made, and sending them the Rules of the Institute to prove to them that I had only charged what was fair and reasonable, or rather that I had charged considerably less than what was customary. A long correspondence ensued, and I made every effort I could to avoid litigation, suggesting arbitration, &c., and lastly agreeing to make an abatement rather than have any further dispute. All efforts to get paid, however, failed, and finally, some twelve months after the schools were completed and occupied, I was compelled to bring an action to recover my costs. Up to this time no single complaint of any kind whatever had been made either to me, or to the contractors; but in their statement of defence, I found for the first time careless and neglect on my part were alleged, and two hundred pounds were claimed as damages. For particulars of this I had to take out summonses, when after much trouble, I, at last, found part of my neglect was in not sweeping chimneys, repairing harmonium, &c., &c., things not in the contract, and not a single item of which they could substantiate. This counter-claim was at last withdrawn, and a fresh action commenced for breach of contract and neglect, the contractors being also made parties to this suit, and two thousand pounds damages claimed. This action is the one reported by you. The alleged breaches of contract were the use of Lias lime instead of Selenitic, facing bricks, slating, and flooring of inferior quality. With regard to the lime, the Board had already allowed the contractors an extra, although the same was not awarded by me, yet it was claimed by the builders as they had used it in the proportion of two-and-a-half of sand to one of lime, instead of five to one as specified; the other items the witnesses for the Board failed to prove, and Mr. J. P. Seddon, and Mr. T. Thornton Green, a surveyor to the London School Board, and also to the Metropolitan Board of Works, after carefully inspecting the schools, gave such conclusive evidence that the works had been carefully carried out, and that any slight variations from the contract had been made entirely in the interests of the Board, that after Lord Justice Brett had summed up, the Jury found a verdict in my favour, and judgment was given accordingly. Immediately after this the Board withdrew their defence to my action for payment for professional services, agreeing to pay all costs. Such being the facts, I am content to leave your readers to form their own conclusions. My reputation is dear to me, and although

this letter has been necessarily a long one, I trust to your sense of honour and justice to publish it. Shorthand notes of the entire case were taken, and I shall be happy to submit them to you for publication or otherwise, if desired. The matter is certainly one of importance to the profession, and Lord Justice Brett's summing up defines to a great extent, and very clearly, the legal responsibilities of architects, upon which subject there has lately been so much correspondence.—I am, &c.,

HUGH ROBERT GOUGH.

MATLOCK CHAPEL COMPETITION.

SIR,—It might be inferred from the letter of "One of the Unsuccessful 85" in your last week's paper, and also from the last paragraph of your notice of the above, that this competition had been decided in a very unfair manner. So far as we have been concerned in the matter, we have not departed in the least from the bounds of honourable competition, and whatever urgency the committee have used in making their selection, it appears to us that your correspondent is more clever even than they in that respect, seeing that he can determine in far less time than they used in making their selection, that there were twenty or thirty superior designs to ours. No doubt he was pretty certain about the merits of one at least in the number, and had that been chosen we should have heard nothing from him of either urgency or unfairness.—We are, &c.,

DIXON AND MOXON.

SEVENTEENTH CENTURY HOUSE AT DERBY.

SIR,—I notice in your number of the BUILDING NEWS for Feb. 14th, a sketch of an old house built early in the 17th century, at Derby. May I be allowed to correct a mistake which occurs in the short notice describing the house, stating that formerly it had one more bay than was taken down to make room for the street at the side? Formerly, and within my recollection, it had three more bays and gables, making a frontage of five in all, and the ground and first-floor rooms were the entire length of the front. These three bays were pulled down by my grandfather to make room for the street, which entirely spoilt the house and grounds, which used to cover several acres. Several generations of my people have lived in this "Wardwick House," which was my home in early life; and I can well remember the large rooms with their fireplaces like a small room attached, and the beautiful oak panelling. Perhaps you may think fit to correct the mistake in your next number.—I am, &c.,

F. J.

FRITHSTOOL.—CHURCH BELLS.

SIR,—Your definition of "frithstool" reminds me that there is a good and little-known example of the frithstool in Chewton Mendip Church. It is a stone seat cut in the thickness of the wall, beneath a window on the north side of the sacristy. Mr. Parker mentions two examples only, one at Hexham and the other at Beverley, and both are on the north side of the chancel. As I am writing may I ask if any one can tell me at about what period church bells were first hung to wheels, and raised and rung in peals?—I am, &c., R. S. PHILPOT.

Chewton Mendip Vicarage, Bath, Feb. 3.

THE R. S. A. EXHIBITION.

SIR,—The allusion to design for N. P. Church, Dundee, in your critique on R. S. A. Exhibition, is inaccurate in two important particulars. First, the church has no "nave and transepts" in the ordinary acceptance of the terms, and 2nd, the "inevitable tower and spire" are only conspicuous by their absence.

A tower there is, but it is crowned by a lead-covered elongated dome.

As the value of critical remarks depends in some measure on absolute accuracy of description, may I trust to your insertion of this correction?—I am, &c.,

G. S. AITKEN, Dundee.

MR. T. ROGER SMITH has just concluded a short course of lectures on "Architecture" at the School of Military Engineering at Chatham. He has illustrated these by a method which is somewhat novel, for in addition to the usual diagrams, "lantern illustrations" have been employed. That is to say, photographs of buildings have been magnified and projected on a screen by the electric light, with the aid of a large magic lantern. Upwards of 150 buildings, or parts of buildings, have been by this means shown with great brilliancy, as well as perfect accuracy; and the experiment has proved a perfect success.

Intercommunication.

QUESTIONS.

[5685].—**Water-Colour Drawings.**—Will some architectural colourist kindly give me advice as to whether "body colour drawing" (mixing of Chinese white with pigments), or "transparent colour drawing," is preferable for architectural work, perspectives, &c. I see that Mr. Ruskin, in his "Elements of Drawing," pp. 201, strongly advocates "body colour."—Y. Z.

[5686].—**Bells.**—Will some reader show the method of calculating the number of changes that can be rung on various peals, and what is the number of changes on four bells?—BELFAY.

[5687].—**Shop Fronts.**—Will some reader give a few hand sketches showing the details for hoxing to story part for weights, arrangement for revolving shutters, and fixing stall board, framing, and sashes?—IMPROVER.

[5688].—**Skittles.**—What is the best foundation to put under an oak floor to deaden the jar as much as possible, and to keep the joists from sinking?—ISQUARN.

[5689].—**Marble.**—The imparting through these columns of a really efficacious recipe for readily restoring the gloss to a black marble mantelshelf, to which French polish or furniture paste (or both) has been applied, would greatly oblige—MARMO.

[5690].—**Gutters.**—The opinions of correspondents are solicited as to the relative advantages of wood and cast iron eaves gutters with special reference to suitability, cost, durability, or any other grounds. What are the special advantages and disadvantages of each kind? Reference to any source of information would be acceptable.—W. J.

[5691].—**Culverts.**—What is the method of determining the size a culvert should be to carry a burn through an embankment? How much larger in area should the culvert be than the sectional area of the ordinary stream to allow for storm-water, floods, &c.?—W. J.

[5692].—**Girders.**—On page 65, "Tredgold" (1875 edition) gives this rule for finding the breadth of girders when the depth and length are known

$$L^2 \text{ in ft. } \times W \text{ in lbs. } \times .011 \text{ (which is (a.) in Table VII.)} \\ D^3 \\ \text{In applying this to the following case where the girders are 8 ft. from centre and have a 20 ft. bearing, being 14 in. deep, and to carry 13 cwt. per ft. sup., the result comes out} \\ \frac{(400 \times 31360 \times .011)}{2744} = 50.285 \text{ inches.}$$

Will some of your numerous readers be good enough to point out what is wrong in the above? And tell me if there is a better way than this of adapting the formula on p. 14 of Hunt's Handbook $(W = C \frac{b d^2}{L})$ substituting

$$x \text{ for } b \quad W = \frac{x d^2}{L} \quad \text{or } x = \left\{ \frac{W}{C \times \frac{d^2}{L}} \right\} \div C \\ \frac{W = 8 \times 20 \times 13 \times 7}{\text{divided by 2 for dist. load}} \left\{ \begin{array}{l} \text{on p. 17} \\ \text{C = 4 for fir. (p. 16)} \\ \text{less } \frac{1}{2} \text{ as advised on foot note, p. 16} \end{array} \right\} = 980 \text{ cwt.} \\ \text{Then } x = \left\{ \frac{980}{\frac{3 \times 14 \times 14}{20}} \right\} \div 3 = 11 \frac{1}{2} \text{ inches.}$$

STUDENT.

[5693].—**Turned Newels.**—Are turned newels to staircases fashionable at the present time? I seldom see one in an architect's drawings, or in the architectural journals. Most of them seem to be square hand-wrought moulded newels. Would some kind friend who really knows what is now generally used give a sketch of newel and outer string suitable for an ordinary villa or good mechanic's cottage, and oblige an old-fashioned staircase hand who is now a

COUNTRY PRACTITIONER.

REPLIES.

[5667].—**Portland Cement.**—To Smeaton we must accord the honour of having introduced this cement. He was the first to investigate scientifically the hydraulicity of certain limestones, and his experiments for Eddystone lighthouse with Aberthaw lime and tarrus and puzzolana, resulted, I believe, in the origin of the name through the cement resembling so closely Portland stone. From Vitruvius downwards little was known respecting the property of hydraulicity till Smeaton showed how to make limestone that should stand and harden under water. Portland cement subsequently began to be made with river mud, but it must be remembered that the same cement can be obtained from many other materials besides those of chalk and river clays.—G. H. G.

[5670].—**Laundry Drying Closet.**—I have seen a drying room heated by Hearn and Co., of Liverpool, with small wrought iron pipes in, bore; the heat attained was 170° and it worked in a very satisfactory way, and was very little trouble, only requiring a pint of water once a month. I think "Bar of Soap" would find this apparatus to be all he could desire, and in time it would pay for itself it is so simple and economical.—J. A. BRICK.

[5671].—**Storing Rain Water.**—Taking the rainfall to be 18 in., 20,400 odd gallons would fall on the given surface in the course of a year, allowing 56 gals. per day. Authorities consider a four months' supply should be provided, and this would require a tank containing 1,680 cubic ft. or about 12' 0" x 12' 0" x 7' 6" inside dimension. The variable nature of the supply precludes the possibility of regulating the size of the receiver more nearly.—A. L.

[5672].—**Gilding Plaster Casts.**—A gilder will know to treat it. Gold will keep its colour and last a long time. Silver exposed to the air will speedily tarnish and become black.—JOHN ALGAR.

[5673].—**Fir.**—Make acquaintance with the working foreman of the nearest timber yard, spend an hour with him every morning before office hours commence, for three weeks or a month; you will then obtain more prac-

tical knowledge on the subject than by any other means.—G. H.

[5673].—**Fir.**—There appears to be nothing inconsistent or unfair in giving the questions referred to, as the different kinds of fir timber are easily recognised when worked up. White fir or spruce (or white deal) has a uniformly whitish colour from the comparative absence of resinous matter in the pores, the rings being less distinctly marked than in the red fir. The knots are of a dark brown colour, hard, brittle, and apt to get loose. There is no difference of colour between the sap and heartwood. Red fir or pine, or yellow deal, has the hard and soft rings very distinctly marked, giving the surface a honey-combed colour with reddish streaks, and gives off a strong resinous smell when being worked. The knots are of a bright red colour, and not so hard as in the white timber. The sap wood is usually darker than the heartwood, assuming a greenish hue on being exposed. Baltic red fir is heavier, and the balks run larger than the white fir. Yellow pine (American), has a brownish colour with small black streaks on the surface. It is lighter, straighter in the grain, freer from knots, and more easily worked than the yellow deal. Pitch pine has a reddish appearance, the pores being filled with resinous matter, giving off a strong smell. It is a very heavy timber, with a sticky feel, which renders it difficult to work.—C. W.

[5674].—**Ordnance Datum.**—By obtaining a sheet of the Ordnance Survey having one of the known bench marks on it, "Beta" would obtain the figures for it, which could then be used to bring his figures to ordnance datum. The process seems so simple that I am afraid I have mistaken the meaning of the writer.—A. L.

[5676].—**Orders of Architecture.**—No modern work of a similar kind to Nicholson's has been published giving the subdivisions of the "Order" at the side. There is a little treatise by Leeds in Weale's series; but "Nicholson's Principles of Architecture" would meet "C. B. C.'s" wants, and second-hand copies may still be obtained. Of course there is Gwilt's Encyclopædia, but the Orders are drawn small.—G. H. G.

[5677].—**Body Colour.**—I presume "One in the dark" is writing of water-colours. My own practice has been to avoid body colours in water-colour drawings, and to use as little of it as possible, and that only in the touches of foreground. To obviate maddiness and unevenness, however, the rules are simple. Select paper with a good tooth, stretch it on a board or frame, well sponging the surface before commencing to colour; i.e., the board a little when laying on your large washes of colour; begin working at the top edge on the left hand with a fully charged brush, and never work backwards or retouch. The last is the main rule to observe in colouring large surfaces, and is indeed the secret of transparent tinting. It is best to begin with the cooler colours.—G. H. G.

[5677].—**Body Colour.**—It is very likely a fault in the plaster or wall. The most effectual way is to give the work a coat of paint and a coat of size before colouring.—JOHN ALGAR.

[5678].—**Painting Cement.**—After 25 years' experience, I have never known anything effectual in preventing wet coming through a painted wall or cornice, let the material be what it may, although many things have been advertised from time to time for the purpose. Water must evaporate, and on the same principle that a boiler will burst that has no safety valve, so will water force its way through any material that confines it. Cover your cornice with lead, and draw off your plinth.—JOHN ALGAR.

[5678].—**Painting Cement.**—Use the silicate paint after removing the old paint.—ARCHITECT.

[5680].—**Clerk of Works Salary.**—An architect who employs a clerk of works, and pays his salary by request of client, is certainly not legally entitled to any profit save interest on the money advanced.—G.

[5681].—**Voluntary Architectural Examinations.**—The instructions appear vague. By "an outline of certain characteristics of the principal historical styles of architecture," they would include Egyptian, Assyrian, Greek, Roman, Byzantine, Romanesque, Gothic, and Renaissance, as the leading; the object of the course is to obtain the candidate's knowledge of leading peculiarities of style. The next requirement means, if I understand it right, that the student should describe in more detail one of these styles, as Greek or Gothic. He may confine himself to English or French Gothic, or to one particular period; this is clearly optional with the candidate. The meaning of the clause, "a specimen detail drawing to an inch scale of the work in each trade, and an equal number of full-size drawings to correspond," is certainly not so clear. The number of trades to be represented would include all those engaged in ordinary building, which I need not say includes the bricklayer, mason, carpenter, joiner, slater, plasterer, smith, ironmonger, plumber, decorator. "Each" in the above clause is, of course, to be interpreted as meaning drawings of all the trades.—G. H. G.

[5682].—**Cubic Space.**—"Hexagon" will find his query answered if he turns to the Commonplace Column under this head. For dwellings, 600 feet cube is the least, though for dormitories it should be at least 800 feet per head. For hospitals, 800 to 1200 cubic feet are allowed per man, the larger quantity being necessary for dormitories in acute cases.—G. H. G.

[5684].—**Fixing Tiles.**—The tiles will not come off again if "Calor" will have flat iron bars built into brickwork at back, upright with ends turned in; from these bars, small projecting pins, with a thread worked on end; these to come through at the corners of tiles, which might be filed off if found necessary, to allow the pins to pass, and still keep a close joint. A brass or steel boss can then be screwed on to each pin, which will each be holding the corners of four tiles apiece. The distance apart for bars and pins to be decided by the size of the tiles, and length of pins by thickness of same.—LXXXIV.

At a vestry meeting held at St. Peter Mancroft, Norwich, on Thursday week, it was decided to take in hand at once the repair and restoration of this fine 15th century church, the largest in the city, and a committee was appointed to carry out the work.

Our Office Table.

MESSRS. RANSOMES and RAPIER, engineers, of London and Ipswich, have published a pamphlet, in which they draw attention to the defects of narrow rails for tramways, and the growing nuisance they have caused in the London suburbs. What the authors say, as regards the inconvenience of driving ordinary vehicles over tram lines cannot be called in question; but we think the greatest nuisance arises not so much from trying to keep on the metals as from attempting to avoid the ruts or grooves between the pitching and the rails. To obviate the narrow tramway, Messrs. Ransomes and Rapier propose wider rails, 10 to 3in. broad, which, it is believed will allow anyone to enjoy the easy motion. "One wheel hugs the groove, but does not enter, and the other runs on some part of the 10in. face on the opposite side." This wide tramway has been in use seven years under very heavy traffic, it is alleged, and is found to be convenient, both for ordinary as well as tramway traffic. In Glasgow, the plan is found to answer, and is said not to have cost 6d. for repairs for 7 years. Looking at the drawings of the "Permanent" Tramway, we find they are made of cast-iron T-shaped, in section, the groove being in the centre. They are cast in short lengths, the surface being "chilled." The hollow underneath is filled up with concrete, and the blocks are laid upon concrete beds 1ft. 10in. wide by 6in. deep. They are, in fact, continuous blocks of cement concrete with chilled cast-iron surfaces, thoroughly rigid, and fastened by fish plates and bolts. The authors lay great stress upon the value of rigid tramways, and allude to the continual movement of the ordinary rails which rise and fall, and by this action are constantly sucking in and squirting out surface water, which action tends to rot the sleepers and produce speedy decay by the abrasion. To prevent the wide faces becoming slippery to the horses' feet, small grooves are formed along both edges at short intervals. We think the proposed method of laying has decided advantages in these respects, and we prefer the section of rail shown with flanges below tailing under the stones, as obviating the evil we have so frequently pointed out in our pages.

ANOTHER corporation fight has taken place over the building of public offices for Southampton. We commented not long since upon the attempt to spend a large sum of money in the remodelling of an old structure long since displaced by the growth of the town from its true business centre, and last Wednesday week the council, by an insignificant majority, decided not to throw away £7,000 of the ratepayers' money on such a scheme. So far this decision is satisfactory. It appears that Mr. Lemon, the consulting engineer, had instructions to prepare plans for rearranging the present building and adding to it, at a cost not exceeding £3,000. Mr. Lemon found this sum quite inadequate; the estimate came to £7,000, and from this amount the sum of £2,000 was

ultimately struck off in respect of decoration. Now £2,000 is a large sum to strike off for such a purpose, and would go a long way in acquiring a better site. From what we can gather the council are indebted to their engineer a considerable sum for his services, which might have been spent on premiums to obtain the best talent of the country. As regards the cost of a town hall and offices, an expenditure of £20,000 would be sufficient, if we consider the requirements and estimated cost of the buildings for a similar purpose erected at Leeds, Wakefield, Barrow-in-Furness, and other places. The Southampton town council will, no doubt, see that a public competition from the whole profession is the best and least expensive course to pursue, and, if liberal premiums are offered and fair dealing is guaranteed, they will in due time get a building worthy of the town.

THE annual meeting of the subscribers to the Birmingham School of Art was held on Wednesday afternoon, at the Midland Institute, under the presidency of Mr. William Morris. In moving the adoption of the report, the chairman said he believed that a very decided improvement had taken place during the past year in the work of the students. The report having been adopted, Mr. Morris was re-elected president, and on the motion of Mr. J. H. Chamberlain, it was decided that the nomination of students by subscribers should be discontinued. In the evening the president distributed the prizes to the successful students in the town-hall, and delivered an exceedingly interesting address, to which we shall probably refer at greater length next week, on the progress of art at home and abroad.

THE Sowerby Bridge Local Board have just erected baths, public offices, and abattoirs, the plans of which are before us. The ground plan of site is oblong, and some ingenuity has been exercised in the management of the ground level and the steep slope to the river. A swimming bath 6ft. by 21ft., surrounded by paths and dressing boxes, is placed in the rear close to the river, the entrance to it being by a long passage with steps, which also gives access to a smaller swimming bath for boys, and a series of private baths. The arrangement of entrance is well managed. There it also a washing and drying room, below which is the boiler house. On one side of the bath entrances are the public offices, comprising offices for the surveyor, accountant, and collectors, with a board-room over. The swimming baths are roofed with iron, the principals being trussed and these carry wood purlins. A ridge ventilator is provided over the large one which is lighted by windows facing the river; the other baths have skylights. On the other side of the site is a range of buildings arranged as cattle pens, and slaughterhouse. The fall of ground has here been made the most of by forming the pens below the roadway to the abattoir. A fire-engine station is also provided at the entrance. Mr. J. H. Smedhurst, the Surveyor of the Local Board, prepared the plans.

It may not be generally known that the Local Government Board have certain rules in respect of pipe-laying, among which we find that street

mains are recommended to be of cast iron not less than 3in. internal diameter, and to be well varnished; that lead is not advised to be used with soft water in service pipes or cisterns, but that wrought-iron tubes with screw joints may be employed for house service; that house-taps should have screw joints of the "screw down" kind; and that in wrought-iron pipes double screw joints at convenient places should be inserted to allow of easy repair or the removal of a pipe. These are useful precautions, though not often consulted. There is no doubt wrought-iron pipes are cheaper, stronger, and better than lead. In towns iron and lead pipes should be protected from the injurious action of some soils, and for this purpose a lining of asphalt, Portland lime concrete, or sand may be employed. A fall of 5ft. per mile is found sufficient for a conduit of 2ft. diameter, and for less falls larger diameters should be used. The New River conduit is about 1 in 10,000. The suggestions as to tanks of cast iron are useful. The bottom must be well supported and the sides securely stayed. The tie-rods should be made to pass through the plates and be secured by washers on the outside, not to internal irons. In all iron tank work cleaning and painting should be done once a year: neglect of this has caused many tanks to burst by the corrosion of bolts and tie-rods. Iron tanks for houses should not be exposed to the action of the sun, but clothed with boards lined with felt.

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CHIPS:

In our description last week of the National Provincial Bank of England at Sunderland, accompanying the illustration, we omitted to state that Messrs. Bellman and Ivey fixed there four large Scagliola columns, in Rossi-de-Levante, with polished white moulded capitals. The building necessitated the erection of iron stanchions within the columns; these were first placed in position, and the Scagliola columns subsequently sent from London and fixed round without showing joint.

A valuable collection of local geological specimens, formerly belonging to the late Professor Harkness, F.R.S., has been presented to the museum at Carlisle.

Mr. F. J. Francis asks us to correct an error which occurs in our report of his paper on "Hotels and Restaurants." We described Crosby Hall as having been altered by Messrs. Francis and Saunders—it should have been stated by Messrs. Francis only.

On Monday week, at a meeting of the Royal Scottish Academy, held in Edinburgh, Mr. James Cassie and Mr. Robert Gavin were elected Academicians.

The new West Ham and Stratford Dispensary, in West Ham-lane, Stratford, E., was opened on Friday week. Mr. J. T. Newman was the architect, and Messrs. Hooking Bros. were the contractors. The cost has been nearly £4,000.

Plans have been approved by the Bradford Church Building Society for a new church, proposed to be erected at Manningham, at a cost of £8,000.

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THE BUILDING NEWS.

LONDON, FRIDAY, FEBRUARY 28, 1879.

ART, ITS AIMS AND OBJECTS.

AT the distribution of prizes, last week, in connection with the School of Art, at Birmingham, the President, Mr. W. Morris, delivered an interesting address, which, though it must to a considerable extent have been delivered over the heads of its hearers, yet contained some salutary truths. The Birmingham School of Art is an influential Society aiming at a wider art education than that usually fostered by a mere local school; it stands first in the list of schools of the second grade, and in the national competition it has always maintained a creditable position. This being the case, we cannot be surprised that the president took a rather extended view of its work and prospects, and that the aim and objects of art, were looked upon from a somewhat lofty standpoint. Allowing that the circumstances called for a more than ordinary comprehension on the subject, we cannot but think Mr. Morris's address dealt too much in hyperbole, and too little with the practical in art, before so practical an audience as that gathered before him in the Midland Institute at Birmingham. Parts of the address must, we fear, have been rather unintelligible to many. The burden of it was a protest against the aimlessness of art, and the commercial spirit of modern life. History, morality, and politics were strained to interpret some very easily explained facts, and the speaker seems to have been carried away occasionally by his enthusiasm into rhapsody. We can heartily sympathise with the desire of Mr. Morris to raise the tone of art, to minimise the amount of unhappy and misdirected labour in the world. We agree with him that the chief duty of civilisation should be to set about making labour happy for all, rather than to encourage art and energy for warfare. We are ready to admit, too, that a large proportion of the work done is dishonest and degrading; that is to say, tending to make some rich at the cost of the slavery of others; or, in a word, that the ultimate end of true art is lost. But these sentiments are not new. Bentham and Hume, Mill, and other moral and political economists have all laboured in the same field in the effort of reforming and improving human life, and directing energy, and while they have indicated the way, Mr. Morris has only pointed out the effect as regards one branch of industry. The virtues of "honesty and simplicity of life" doubtless lie at the foundation of all true and pleasure-giving art, and the problem is how to secure these aims. According to Mr. Morris, this degradation of art has arisen mainly from the evasion of plain duties, from luxury, and the competitive spirit of the age; but it is necessary to point out here that these things are to a certain extent inevitable to our transitory stage of modern civilisation; that the present age is one in which the commercial activity is the greatest, and that it is quite as impossible to live now the simple life of the Plantagenet village craftsman, as it is to reach the Utopian millennium of art which Mr. Morris places before our vision. We are told, "From Ispahan to Northumberland there is no building built between the seventh and seventeenth centuries that does not show the influence of the labour of oppressed and neglected herds of men. No one, indeed, rose high above his fellows. There was no Plato, or Shakespeare, or Michael Angelo amongst them, yet, scattered as it was among many men, how strong

their thought was! how long it abided! how far it travelled! And so it was ever through all those days when art was vigorous and progressive. Who can say how little we should know of many periods but for their art? History (so-called) has remembered the kings and warriors because they destroyed; art has remembered the people because they created." Very true, indeed, is the assertion that a century of the Byzantine empire gives us a weary chronicle of "pedants, tyrants, and tax-gatherers to whom the terrible chain which long-dead Rome once forged still gave the power of cheating people into thinking that they were necessary lords of the world." Truly history has left a tale of "languor, and the evil deeds of kings and scoundrels"; but that there were others of whom history does not speak who have left us evidence of honest labour done in grief and joy. In the records of art no one can gainsay the fact that art, during the mediæval period, was greatest when the individual artist was nothing, whereas it is quite as incontrovertible that art has declined as the artist's power has become more personal. All that we know is that it is an unalterable condition of history rightly read, only to be explained by the creation of the multifarious activities of a more complex state of society. Before we can make the art workman's labour less dreary and degrading we must remove the obstructions and restrictions under which he lives. Mr. Morris admits there is "an apparent external progress in some ways; that in England painters of pictures have grown, are more conscientious in their work, and have expressed a sense of beauty the world has not seen for the last 300 years." He admits also that in architecture and the arts that attend it, there has been great improvement in England, though other countries have done little more than stand still. "These improvements have, it is said, concerned comparatively few people, the mass of our population not being in the least touched by them, so that the great bulk of our architecture—the art which most depends on the taste of the people at large—grows worse and worse every day. You must go to London if you don't believe it." Mr. Morris, whatever his qualifications to speak of art generally, certainly does not in his opinion as regards architecture agree with the bulk of intelligent or discerning critics concerning it. It has been admitted by every authority capable of forming an opinion that architecture has made rapid strides during the last quarter of a century. We do not point to any particular phase of it, or to any ruling fashion, but to the general appreciation of truthful construction and honest expression it has been the witness of. If we mistake not, the opinion advanced by Mr. Morris is shared by others who deny to modern architects the right to create new, or to restore old, buildings, but who at the same time are always uttering a lament at the national decadence of architecture. Such pessimism, to say the least, is not healthful or hopeful, and the sooner we accept, in a true spirit, our present position as the only one possible for our age, the more likely it is we shall make an advance. We note that the president extends the progressive period of architecture to the seventeenth century—two centuries later than is usually accorded; but surely, if we can acknowledge the building of that period, we may include our own century? "Though many of us love architecture dearly," he observes, "I believe that it helps the healthfulness of body and soul to live among beautiful things, we of big towns are mostly compelled to live in houses which have become a by-word of contempt for their ugliness and inconvenience. The stream of civilisation is against us, and we cannot battle against it." We will not dispute the

truth of the allegation, but is it possible for any art reformer to give us better houses till the people are prepared to receive the lessons of art? Passing to pattern design, the speaker called attention to the deterioration of art in the East, which has always been held in such high esteem among ourselves. In short, the address pointed to another instance of the falling away of the art instinct, which nearly always succeeds conquest and civilising agencies. In India it is said Englishmen in their short-sightedness are actively destroying the sources of that education we are attempting to promote, in jewellery, metal-work, pottery, calico printing, brocade-weaving, carpet-making; all the famous and historical arts of the peninsula have been thrust aside for the advantage of any paltry scrap of so-called commerce. The "art manufactures" of India are beginning to deteriorate, and the "conquered races, in their hopelessness, are everywhere giving up the genuine practice of their own arts, which we have loudly proclaimed are founded on the truest principles." The speaker alluded to the way Government is furthering this deterioration by manufacturing cheap Indian carpets in the Indian gaols. Mr. Morris does not say this is a bad thing if properly managed, but complains that it will make wares cheap, and that it is this desire that is destroying Indian manufacture. In fact, Eastern art is dead, and "the commerce of modern civilisation" is declared to have slain it. "Obvious as is the surface improvement in the arts within the last few years among ourselves," the president said, "there is something wrong about the root of the plant to exult over the bursting of its February buds."

But what is the remedy proposed for all this? Much there is that we admit in this long wail of lamentation; civilisation is against art we are told more than once. Great men of art have but a narrow circle that can understand them, and are utterly unknown to the great mass of people. Art, in short, has become a too delicate thing for the people; many honest and intelligent men eager for human progress, yet anti-artistic, believe art to be intended only for the few: hence their treating it lightly. Mr. Morris attempts justly to disabuse this idea; he shows that all the treasured art we collect at Kensington and our museums is nothing extravagant, but represents the common household goods of past times. The things we value were common things in their own day, no rarities; no great artist drew the designs for them, highly paid, daintily fed, or carefully housed; but they were made by "common fellows," as the phrase goes, in the common course of daily labour. Their labour was not irksome. Take, again, the treasures of architecture which we study so carefully—how were they made? The village churches were designed not by the great architect carefully kept for the purpose and guarded from troubles, but by the monk, the ploughman's brother, the village carpenter or mason—"a common fellow whose everyday labour fashioned works that are to-day the wonder and despair of many a hard-working 'cultivated architect.'" This art, so careful, delicate, and inventive, may be seen in out-of-the-way hamlets, in the chest of the yeoman's wife as well as in the throne of the great Plantagenet, and it brought with it happiness and made life endurable. The president says, in short, "the thing which I understand by real art is the expression by man of his pleasure in labour. I do not believe he can be happy in his labour without expressing that happiness, and especially when he is at work on anything in which he specially excels." Only in these later days has this universal gift been rejected by man. To the "hurry of the war of the counting-house and the war of the battlefield" is attributed the irksomeness, and dishonesty, and the pleasurelessness of all our work.

The president would do away with the "toil which makes the thousand-and-one things that nobody wants, which are used merely as the counters for the competitive buying and selling falsely called commerce," and he would encourage "an art made by the people for the people—the expression of man's happiness in his labour." A little reflection will show that the loss of pleasure in the workman's labour is due to several causes beyond control. Machinery has entered into uneven competition with hand labour, driving all art manufacturers to produce their goods in the cheapest way, while competition is so great that hand labour has become a mere luxury only available for those who can pay for it. These are really the causes of the degradation Mr. Morris speaks of, but which, singularly enough, he does not once allude to. The popularisation of art is an excellent idea, but we need only say it is a work of time and education. Before our daily wants and appliances can be made artistic the public must be brought to realise the intrinsic value of art as an education of the senses, while the artist must be taught to bestow his labour less grudgingly on the commoner things of life. Again, to produce "happiness" in any work, it should not only be congenial but remunerative, though Mr. Morris does not tell us how this is to be attained under the present dispensation of labour. We cannot help thinking the Birmingham address, while it may have inspired the enthusiasm of the young student, failed to teach much by its dismal retrospect; and that the Utopia of art so graphically sketched by the president would have been a little less visionary if the plain duties of the British working man and student of art of the nineteenth century had been more clearly defined.

OUTLINE AND COLOUR AS ILLUSTRATED IN THE DRAWINGS OF THE OLD MASTERS.

A PART from the actual subjects of the works themselves, the sketch studies of Raphael, Da Vinci, Michael Angelo, and other masters now on view at Burlington House and the Grosvenor Gallery, have some particular points of value for the architect and decorative artist. In the first place, they entirely run counter to the ordinary ideas of modern artists and teachers of art by the want of finish and the lack of laboured execution they display. It is a common error nowadays to estimate the value of a work of art by the amount of mechanical labour bestowed upon it, by that appearance of painstaking care in very little detail, as if the artist were successful in proportion to the number of lines or touches he had crowded on the paper. Of course, this is a vulgar error, and we may say, as a rule, that the merits of a work of art of every kind are almost directly in proportion to the visible ease and facility of the artist's expression. To those who have any doubt about this we commend the collection of studies in the galleries of drawings above referred to. We may, for example, refer to the gradation of line and tone perceivable in the inimitable sketch landscapes of Canaletto, or the figure compositions of Raphael, Parmigiano, or Carracci. We observe nothing like finished features, details of dress, or half-tints, certainly nothing approaching a finished background; the lines of the principal figures are sketched in vigorously, in total forgetfulness of those in receding parts or planes of the picture, yet in perfect accord and balance with them; there is never a crowding or confused assemblage of figures jostling one another, and detracting from the chief theme, and no lesson is more forcibly taught us than this one of subordination of line and manipulation to the central idea of the study. In the "Study of a Tree," by Annibale

Carracci, in Gallery VII., the artist has by a few well-chosen and vigorous strokes of his pen, aided by bistre wash, produced an impression more telling in its completeness than another artist's work who had taken the pains to mark every spray or group of foliage with the minuteness of an etcher. Again, let us take the study by Parmigiano, "Christ and His Disciples Worshipped by a Crowd of People." Here the prominent figures are sketched with a power of grouping and dignity worthy the master. Although there is a crowd, there is no sense of confusion, and every line and touch of tinting throws up in marvellous perspicuity the idea uppermost in the artist's mind. The drawing is washed with bistre and touched with white—a mode of sketching very effective and expressive, and largely made use of by the cinque-centists. In Michael Angelo's "Figure of the Dawn: Tomb of Lorenzo de Medici," there is more finish, the drawing is executed with silver point, yet we find in it rather the delicacy and grace of ease than of laboured execution. The same great master's copy of portion of the "Last Judgment," in the Sistine Chapel, is another model of execution. A vigour of thought seems to struggle through the mere hand-work of lines in black chalk; as we witness quite as forcibly in his study of "Three of the Labours of Hercules"—a masterpiece of action in drawing. Equally remarkable is the pen and bistre sketch by F. Baroccio of the "Assumption," and some of the studies of Giulio Romano. There is in nearly all the masterpieces of composition a predominant idea or attitude that is at once perceived, and we are never left in doubt as to the meaning or movement sought to be conveyed by the artist. A few lines convey the expression of face, attitudes, and draperies, while degrees of solidity are expressed by skilful washes of colour. It has been remarked by an able French critic that "drawing itself is nothing but the immediate result of the differences of colour; the ideal line which bounds coloured surfaces." We have clearly in this definition the real value of lines as a mode of art expression; we must regard them chiefly as the contours or boundaries of surfaces and masses than as essential to art representation. Prudhon, it is said, instead of drawing his external bounding lines like other artists, began with his masses of light and shade. He commenced, in short, by modelling the forms instead of defining their contours, and in this respect he followed the true theory. M. Ingres also began the internal modelling of his figures, and afterwards marked their outlines. The advantage of this mode is that it makes the artist more careful of the gradations of colour, light, and shadow; the modelling and relief of his figures become the principal aim. The value of giving painters models is therefore evident; the old masters were taught figure drawing by this method, and if our artists were also more frequently adepts at copying from the round, the better it would be for art. In one direction, that of *chiaroscuro*, or the arrangement of lights and shadows, the sketches and studies of the old masters are significant. How the figures of Rembrandt and Raphael stand out!—there is no rigid contour apparent, no difference of mere colour, so much as variation in the amount of light thrown upon the different surfaces or figures. It may be called in fact the art of modelling on the flat. It gives that indication of relief which is the chief value in a picture or composition, and in short *chiaroscuro* constitutes the painter's power of modelling, so to speak, the various parts of his picture to produce a satisfactory whole. Each object or figure should have its own degree of relief, and these in turn should be placed in their proper planes or relations by the same agency of light and shadow. No artist will dispute these principles, and they

lead us to speak of the importance of that class of works in which light and shade in its various and subtle degrees take the place of colours. The term "black and white" aptly, though perhaps roughly, designates our meaning.

It is well known that with some of the greatest painters the rigid linear contour was lost in surroundings; so it was with Murillo and Correggio, so with Rubens and Rembrandt. Varied relief and appearance of movement is the result of this practice, while the accentuation of outline, as we see in the pictures of Ingres and many modern artists, at once destroys apparent depth and reduces every figure and object to a dull flatness. It must not be understood from these remarks that we undervalue the importance of outline, but our object has been mainly to show that in composition and figure-subjects contour is of secondary importance to modelling, light, and shade. There is no absolute line in nature.

The first sketches of the great masters, as we see them at Burlington House, were remarkably free. They were the result of a masterly disposition. The figures seem to be thrown together under groups or masses, never in higgledy-piggledy confusion. Raphael, Michael Angelo, Da Vinci, Delacroix saw things in their *ensemble*, and each line and stroke of pencil or colour had a generalising boldness at once bringing out and relieving the figures and expressing their movement. If we attentively examine the black and white studies of these masters, we at once see the *rationale* of the process: they began by modelling in more or less broad washes, building up their figures in proportionate quantities of light and shadow till the outline was nothing more than the finish. In all their work "detail" had a subordinate place; they never began by drawing a head here, an arm there, and so on, but with the instinctive flash of genius they portrayed the total impression, filling up afterwards. Every touch of colour or shade had, however, a form and meaning.

Lastly, we find that monochromes were favourite modes of execution. Low-toned colours, and especially browns, were the principal pigments employed, and sepia or bistre were chiefly used. Mixtures of brown and cool greys add much to the effect and relief, but the whole compass of light and shade and tone was quickly realised by the heightening effect of white. It is wonderful what a variety of effects and tone may be got from black, say ivory black, and white. Every conceivable combination of grey and shadow can be produced; and the advantages of black or low-toned browns need not be enjoined here for all studies for sculptured decoration, particularly those of the architectural artist. There is a love among many of our water-colour artists for thick painting—a heavy, impasto kind of style, which seems to us to prevail among those who have the least confidence in their work. The colour is added and thickened till the drawing becomes lost. For architectural subjects transparent colouring has undoubted merits, and the aim of all skilled colourists is to produce effect with the least expenditure of colour.

LECTURES ON THE RISE AND DEVELOPMENT OF MEDIEVAL ARCHITECTURE.*

THE lectures delivered at the Royal Academy by the late Sir Gilbert Scott, R.A., just published by Mr. Murray, possess a more than transient value to the student. They are the outcome of the study and experience of an admitted master of mediæval architecture and, we may add, the most celebrated Gothic architect of the

* Lectures on the Rise and Development of Mediæval Architecture, delivered at the Royal Academy by Sir GILBERT SCOTT, R.A., F.S.A., LL.D., &c. London: John Murray.

present century. Delivered in the heyday of a professional reputation, amid the daily cares and absorbing labours of an unsurpassed practice, there is much in them that will now be read a second time with renewed interest by the architectural student and even the professional man. As many of the later lectures have been fully reported, and as several of the illustrations have already appeared in our own pages, we take it for granted that the scope and object of the work are pretty well known to our readers. In the preface to the lectures written by the late Sir Gilbert Scott, so late as the beginning of last year, it is stated that only half the lectures were delivered by him as Professor at the Royal Academy. The first seven were delivered while Professor Cockerell held the chair, but owing to his health, Sir Gilbert Scott, in conjunction with Mr. Smirke, was called upon to relieve him of this duty. The eighth, ninth, and following lectures were given after the retirement of Mr. S. Smirke. These circumstances have naturally tended to produce a somewhat disconnected series, which is pointed out by the author; but, as we can fully believe, he says they were "written with much zeal," and to his pupils and sons he accords thanks for the assistance rendered in the illustrations, which are certainly very profuse and, on the whole, highly creditable. A note to the preface acquaints the reader that many of the illustrations have been prepared from sketches and marginal references left by the author by Mr. W. Samuel Weatherley, while others have been procured from reliable sources. Perhaps the first lecture is more characteristic of Sir Gilbert Scott's mind than the later ones. He begins by enforcing the historical claims of Pointed architecture upon our study—a task for which no one better than he could have been chosen. These claims have sufficient interest, even at this time, to be recalled. The first is that Gothic architecture is the architecture of the modern, as distinguished from the ancient world; the second, that it is a style *par excellence* Christian; and lastly, that it is the native architecture of our country. These claims are discussed in a moderate and conciliatory tone. The claim that Pointed architecture is Christian is argued in a like spirit. The author acknowledges that it is not the "only Christian style which has arisen or is likely to arise, but that it has been more entirely developed under the influence of the Christian religion, and more thoroughly carries out its tone and sentiment than any other style." This is a sensible view of the case, and one which no anti-Gothicist is likely to call in question. The lecture then proceeds to the intrinsic or abstract claims of the style, and in discussing these we find the author still moderate, and not affirming anything questionable. He, of course, dwells upon the advantages of the arcuated over the trabeated system, especially the pointed arch, though he does not urge it to the detriment of other forms. The facility of the style in decorating construction; the flexibility of its forms, such as the arch and vault; its adaptability to varied climates; its power of uniting the arts of painted glass, sculpture, &c.; and the special objects of its study are pointed out with a master's hand. In the last of these remarks, he points out the danger of pursuing the study in a spirit of antiquarianism. He suggests that our own object should be art, not antiquity—useful hints, but which the author himself lived long enough to see impugned. In another part, he impresses the value of real study derived from buildings themselves, as being of more importance than facts obtained indirectly. In lectures II. and III. the rise and development of Mediæval architecture is sketched, and from these the younger student will derive a more connected account of the growth of

the style than from any other elementary work we are acquainted with. The structural process which gradually transformed the Romanesque basilica into the pointed-arched church, is clearly traced to statical and æsthetic reasons; the history of vaulting is sketched from the early barrel vault to the groined oblong bay, the works of Dr. Whewell and Professor Willis being here laid under contribution. We may remind the reader that the author repudiates the capricious origin of the pointed arch, and attributes its introduction solely to the necessity of statical construction, and chiefly to its diminished thrust; not, as asserted by some, to the necessity of obtaining arches of equal height at the side of oblong groins. In substantiation of this view, the earlier of the French Transitional churches are quoted, such as Noyon Cathedral and St. Germain des Prés; while at Canterbury also we find the wall rib round, and the wider or cross arch pointed. In fact, Sir Gilbert Scott believes the arch of this form was adopted for constructional motives, and these he classifies under statical, geometrical, and æsthetic heads—the first exemplified in wide-span arches, the second in narrow arches of oblong vaulting, &c., and the third in the harmonious combination of various arched forms. The French architects were the first who undertook the solution, and to perfect the system. Some beautiful illustrations of the apsidal chapels of St. Denis, Noyon, St. Germain des Prés, and the Cathedral of Sens (the supposed archetype of Canterbury) accompany this interesting section of the work, while excellent representations of the Choir of Ripon, Canterbury Choir, and Trinity Chapel, Chichester Cathedral, Tynemouth Abbey, and St. Cross, Hampshire, exemplify the working out of the problem in England during the so-called Transition. We cannot but admire the beautiful illustrations of Chichester Cathedral, Tynemouth Abbey, and Hexham, as representing the later works of this period, and as unique examples of architectural drawing applied to book illustration. The nave of Fountains Sir Gilbert designates as Romanesque, as also Kirkstall and Buildwas. Of another stage, called the refined Norman, the Galilee at Durham and St. Mary's Abbey, York, are instanced, though the last has decided pointed arches; while the author places St. Cross, near Winchester, as intermediate between these classes. Trinity Chapel, Canterbury, is put in the third class of the Transition or typical of the Early Pointed phase, though retaining just enough of Romanesque to distinguish it from well-developed Early English. The development of carved capitals is introduced here, and is copiously illustrated with examples. The author claims for the English Transition equal nationality with that of France, although the latter preceded the former; and he also says, what every true Gothicist must admit, that the English Transition was carried through to a style more distinctive than that of the Early Pointed of France. The lecture on the thirteenth century enters upon the full-grown Gothic, and the author seems here to expatiate with exultation on a style to which he devoted the best energies of a lifetime. Here and there he is carried away with that fervour and emotion which those who have heard him can best realise. Speaking of the classification of Mediæval architecture and the non-coincidence of the styles with the centuries, he suggests that the Norman should, roughly speaking, occupy the interval between 1075 and 1175, the Early Pointed from thence to 1275, the Middle or Decorated period from 1275 to 1375. Sir Gilbert Scott entertained a preference for the vigour and boldness of the works of the earlier part of the thirteenth century, and it must be confessed his most satisfactory works are executed in the earlier phase. His sketch of

the opening of the century is interesting; in France the secular and ecclesiastical powers had reached a high stage of development, while in England the barons and the Church, at least, were prosperous. At Canterbury the cloisters were added in the perfected style; at York the Norman transepts were rebuilt; St. Hugh at Lincoln made a pretty complete remodelling in the style; Wells underwent rebuilding; the western porch and choir of Ely were undertaken; St. Albans had its western façade, nave, and choir rebuilt; but the most complete works of the age were Salisbury Cathedral and Tintern Abbey, while numerous other buildings, as Westminster, and St. Mary's Abbey, York, were partially remodelled. Perhaps one of the most unique examples of the period is the beautiful Chapel of Nine Altars at Durham. Speaking of Italian Gothic, with which Sir Gilbert largely infused some of his later works, he observes the union of which it was the result "produced many noble and many incongruous developments." He also says truly it should be used with caution. We cannot follow the author through this most interesting lecture, which occupies a considerable portion of the first volume. The characteristics of the style, the various portions of buildings are minutely analysed, and some exquisite examples are engraved; the column and its base are traced, for example, through various changes, and the critical remarks on mouldings will be re-read with profit. The capitals given are unique types, while the western portals of St. Albans (p. 167) is a superb instance of this feature. The following lecture is devoted to some of the leading works of the thirteenth century, and here we find illustrations of the Temple Church, the movable reredos once belonging to the high altar at Westminster, containing very early painting ascribed to an Italian artist; details from St. Ethelreda, Holborn; east front of Ely; Peterborough Cathedral; the south-east portal of Lincoln, and various details of windows. A very instructive lecture is devoted to the "Rationale of Gothic Architecture," in which the author glances at various theories broached as to its origin. It is more to the point that in England the style was developed just when the great institutions of the nation were being formed, that no occult motive existed, but that common-sense applied to plain requirements became the sole motive. "A Digression concerning Windows" is the subject of a lecture in which the author enters into the rationale of splay and the two systems of arching the heads, called the *rere* arch and *through* arch, equally and so variously employed by the Mediæval architects. Lecture VIII., upon the Practical Study of Gothic, contains some very trenchant observations calculated to make many professing Gothicists feel somewhat ashamed of their ignorance of true principles. Sir Gilbert says "Gothic architecture is only to be learned from *old examples*," and the study should be continuous. Hints to students, and various examples in London and elsewhere follow; while in the next lecture the return to English types is strongly recommended, and one sensible suggestion made—namely, that in designing we should design *in English*, as good writers invariably write in their *own* language without recourse to foreign idioms. The advice, though it is less necessary at this moment, comes with much force from one who reached the highest pinnacle of success in the art by consistently following the principles of English Gothic, uninfluenced by the fashions and importations of his day.

In the second volume Sir Gilbert Scott reviews in greater detail the English developments of architecture, and from lecture X. the author commenced the course in his official capacity. In their practical interest to English students, these later discourses possess a new charm. They begin with the Celtic remains in Scotland and Ireland, and pro-

ceed with the churches founded by St. Augustine. Canterbury, York, and Ripon, the churches of Retham, Brixworth, Northamptonshire; Worth Church, Sussex; Bradford, Wilts; Castle Hill, Dover, churches at Monk Wearmouth and Stow, Sompting, Barton-on-Humber, &c., are among those described and illustrated, many in plan and details. The earlier Norman buildings, including Canterbury and Westminster, are considered, the characteristic features of the style are discussed, and the principles of treatment of doors, windows, arcades, and vaulting are shown to have been logically deduced from actual wants. In Lecture XII. the early architecture of Britain is continued, and examples are given of St. Albans, Winchester, Ely, Rochester, Norwich, Gloucester, Worcester, and Durham cathedrals, Tewkesbury Abbey, and Christchurch, Hants. The author thinks it was Durham that influenced Christchurch, not Christchurch Durham, as maintained by Mr. Ferrey. In the subsequent lectures the practical and artistic principles of Early British architecture are discussed, the conditions necessary to the arcuated style are distinguished, and the development of vaulting is thoroughly entered into. It is not necessary for us to comment here upon these lectures, as they have been given in the *BUILDING NEWS*, and fully illustrated. They comprisesome beautiful examples of vaulting, from the plain barrel vault of the Romans to the fan and traceried vaulting seen at Henry VII.'s Chapel. The dome, a favourite theme with Sir Gilbert, is the subject of another lecture (XVI.), in which the developed forms in France, Germany, and Italy are fully described. The pendentive dome is specially dwelt up as capable of being engrafted upon the Gothic, and the author welcomes the cupola, "the noblest of all architectural features," into our revived Gothic architecture. This fact is illustrated by the author's premiated design for the new Parliament House, Berlin (see p. 289), and for the Central Hall of his new Law Courts design—illustrations, however, that do not worthily exhibit the real merits of these designs. Allowing for the somewhat discursive manner unavoidable in the lecture form, we have no hesitation in saying Sir Gilbert Scott's work is one of the most complete and most philosophical expositions of Medieval Architecture that has yet been published.

ROYAL ACADEMY LECTURES ON ARCHITECTURE.

EARLY RENAISSANCE—BRUNELLESCHI.

IN his fourth lecture, Professor Barry dwelt upon the re-birth of Classical ideas in the Gothic architecture of Italy, as specially exemplified in the building of the Certosa and the duomo added to Arnolfo's cathedral at Florence. The Italians, unlike ourselves, broke at once and for ever with Mediaeval architecture, and to this day regard Gothic as barbarous. The Early Renaissance architecture might be studied according to two types. One of these was more affected by the work immediately previous to itself than was the other. The Certosa at Pavia might be regarded as an illustration of the one school, and the works of Brunelleschi as examples of the latter. In the former building they had a building of great richness, with varied details, many very beautiful, but with a complete absence of repose. The architects had borrowed features, without scruple, from the rival styles known to them. There were the beautiful arcaded galleries surrounding the upper part of the semicircular apses, familiar in Lombard churches, and rendered into Northern language in the early buildings of Cologne. Circular arches prevailed in the windows, but the pointed form was also represented. The turrets, with their spire-like tops, gave an effect of verticality, while the enriched cornices asserted the horizontal principle. The elaborate structure, half-tower, half-dome, which covered the intersection of nave and transepts, was one of the

few existing examples showing what might have been the treatment of the dome by the Italian architects of the Middle Ages. It was designed in accordance with the tradition of the day, altered by an admixture of details intended to be Classical. It was composed of successive stories of small columns and arches, gathered inwards, till the summit could be crowned by a small octagonal cupola. The general effect was fantastic, and could not be commended; but it was interesting, as illustrating an attempted compromise between the Mediaeval lantern-spire and the dome. Taken altogether, much could be said in favour of the Certosa, in an architectural sense. It was inconsistent, and its details were wanting in purity of style; nevertheless, many of its parts were admirable, such as the delicate arabesques in the pilasters of the chief façade, which exhibited a refinement of design and execution seldom surpassed. Scarcely any other single building illustrates more clearly the confusion of ideas which ushered in the Renaissance. The movement was one of vigorous individuality in details, without the controlling authority of a strict general design. The Early Renaissance was a period of experiments; of essays, rather than achievements. The designs of the period exhibited a life and elasticity which might have been turned to better account, and with the greater knowledge of the past possessed by modern architects, it might not be too much to hope, even yet, for a skilful adaptation of a style based upon the works of this first period of the Renaissance.

Turning from the Certosa to the Cathedral at Florence, a marked difference in character was observable, although the interval between the periods of erection was not great. The Certosa was commenced about 1396, and Arnolfo died at the commencement of the same century, leaving the arches of his great church unfinished, and his plans for finishing its dome, or domes, altogether uncertain. The completion fell to Brunelleschi, who finished the dome just before his death, which occurred in 1444. At this period the Certosa had been all but completed, with the exception of the western front, which was not commenced until 1473. After the death of Arnolfo long doubt and delay occurred, and at length the question of the day with Florentines was, "How to finish the Cathedral?" Arnolfo had provided enormous thicknesses of wall, to support a great weight of superstructure. He, doubtless, contemplated an inner dome at a lower level than the existing structure, and he may have thought of some aspiring design recalling, externally, the Gothic lantern and spire, as at the Certosa and at Chiaravalle, near Milan. If there existed any idea, however, of realising such a conception, it was abandoned altogether at the bidding of Brunelleschi. A Florentine by birth, Brunelleschi had early acquired the friendship of Donato, and with him visited Rome. This journey was the turning-point of Brunelleschi's career, and determined his subsequent taste in architecture. It is thus recorded that the Pantheon formed a part of his especial studies, and his subsequent proposals were probably based upon an admiration of the simple dome of that unique building. He made plans of temples, baths, palaces, theatres, the Colosseum, and other monuments of old Rome, from which he thought he could learn the methods of the ancients. He then returned to Florence, full of the conclusions he had formed, and as eager as any modern Revivalist to extol the merits of the half-forgotten architecture of the past. He found the authorities in the midst of divided counsels and heated discussions. Architects and engineers had been summoned from afar, and were in full debate as to how the work should proceed. Brunelleschi declared his opinion that the walls should be carried higher; that windows should be pierced in the upper parts of the walls of the octagon; and that the dome should be commenced at a much higher level than Arnolfo had intended. While making these suggestions, he kept back his explanation of the actual methods for carrying them into execution. They were consequently declared impracticable by rival competitors for popular favour, and appeared little likely to be approved. It was curious to note the alternative plans for filling up the central blank. The great question was the need of scaffolding, or internal supports, for so vast a dome, while in process of construction. To meet this difficulty it was proposed to fill up the space with earth, in which money should be imbedded

as the mound rose; and that, on the completion of the work, permission should be given to the people to fetch away the earth, and keep all the money they could find! Other proposals were made for the erection of a central column, or of several internal piers, with arches turned from them, to support a massive scaffolding above, on which the cupola might be raised. It was declared impossible to erect the latter of stone or other solid material, and cysteolite, or sponge stone, was suggested as an alternative. Brunelleschi listened to these proposals with ill-disguised impatience, and, at last, roundly declared that they were worthless, and that the dome could be built without such contrivances, and with no sacrifices of solidity of material or of architectural grandeur. He was voted a dreamer and a madman, and laughed at as a simpleton. In the end, however, the Florentines had to claim the assistance which they now despised. The question was referred to the syndics of the woolworkers and the wardens of the church, and in their difficulty they requested Brunelleschi to lay before them his detailed proposals. It then appeared that he had carefully considered the difficulties of the case, and had matured plans which he was ready to pledge himself to carry out. His written report to the syndics and wardens contained a full description of his ideas. He alluded to the large dimensions of the building, both in width and altitude: the diameter of the dome being 137ft., and the height 280ft.; and decided that the dome should be octagonal on plan, so as to snit the walls, and that the section should be pointed. By this design a certain harmony was secured between the plan of the church and the domed roof over it, but could not be regarded as having solved the problem of a Gothic dome. In the neighbouring baptistry there was an example of an Early Pointed dome of octagonal plan, which may well have served as Arnolfo's model in his general design of his far greater work. There was, therefore, no novelty in Brunelleschi's suggestions, beyond the scale of the work. His originality displayed itself in the proposal of great height, a departure not only from the intentions of Arnolfo, but also from architectural precedent in dome construction. By raising the drum beneath the dome, Brunelleschi evidently desired to obtain a grand external effect, as well as a noble completion of the interior. This had been the aim throughout of the Renaissance architects in contrast with that of their predecessors, who had made the dome the actual crown of their building as well as its ceiling. Brunelleschi's work was rather an octagonal roof, with curved sides, than a dome, in the strict sense of the word. He adopted the Northern method of double construction; but with so little difference between the inner and outer sections, that the whole may be considered a single design. He thus availed himself of the whole thickness of the double section where special strength was necessary, such as at the eight angle ribs. Between the angles he placed piers, two in each bay, to give stiffness to the filling-up of the compartments, and to serve as counterpoises to the thrust of the arch. Between the outer and inner cupolas was placed a circular ring or bond, formed of strong beams of oak, fastened together with iron. The circular bonds were used at about 18ft. apart, and the dome was carried up to a certain height in this manner, without scaffolding or internal support. In Brunelleschi's report he did not venture to premise completion of the work without scaffolding. He only undertook that it should be carried up to the height of about 60ft. From this point upwards he said it might be continued "after such manner as shall be determined on by the masters who may have to build it, since practice teaches us by what methods to proceed." For the lower part he advised the use of hard stone and marble, and for the superstructure, brick or sponge (spugne), for the sake of lightness. It is curious to mark the reserve which Brunelleschi exhibited in his suggestions. He seems to have pointed out the step to be taken at once, leaving his future intentions vague and undescribed. The Florentine authorities did not thoroughly trust him, for they associated with him Lorenzo Ghiberti, known to us for his famous gates to the Baptistry. Brunelleschi brooded over this mark of distrust, preparing his models in secret, and referring objectors to Ghiberti, as to difficulties which he felt sure his colleague could not solve. When the cupola was partially completed, he succeeded in getting left alone, and was appointed sole archi-

test of the fabric for life, with an annual allowance of one hundred florins. In order to facilitate the progress of the workmen he erected a scaffolding inside the dome, although there is no record of any centreing for the arch. On this scaffold he placed, amongst other things, wine-shops and eating-houses for the workmen, so that the latter should not lose time by descending for refreshment. At length, as Brunelleschi was approaching his seventieth year, the two cupolas were all but finished, and nothing remained but to add the lantern, above the circular space, or eye, at the top of the building. In accordance with his usual dilatory custom, Brunelleschi had left this matter unsettled, and while he was engaged on the models of this final detail, the end came. After his death the models were disregarded, and the present lantern was added by others. Brunelleschi died in 1446, at the age of sixty-nine, and was buried in the church to which he had devoted the best years of his life. He figures, therefore, worthily in the list of the Fathers of the Italian Renaissance. He found the Gothic styles of Italy in vogue, but to him the glories of old Rome were the guiding star of his architectural life, and when he died, his mantle fell on other great artists, who were henceforward to conduct the movement.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE fortnightly sessional meeting of the Institute was held on Monday evening, the President, Mr. C. Barry, in the chair. Mr. WURRE, secretary, announced the death of Mr. C. J. Adams, Fellow, of Stockton-on-Tees. Mr. T. H. WYATT, hon. secretary, notified to the members that M. Pascal Coste, of Marseilles, had just died, in his 92nd year. Mr. Wyatt added that he had received a letter from Herr Lepsius, of Berlin, one of their gold-medallists, pressing the Institute to elect Herr Gropius, the Government Architect, as an hon. and corresponding member, and forwarding photographs of works he had executed. The President said Herr Gropius would be nominated at the next meeting, and the Council felt justified in recommending his name, as he had conceived and carried into execution many important works, of which an architect might well be proud. The President then read an extract from a Freemasons' journal, with reference to the election of Bro. John Gibson as Grand Superintendent of Works for England, in succession to the late Bro. Frederick Pepys Cockerell, and said all members would congratulate their old friend and colleague, Mr. Gibson, on his appointment.

Mr. David Ross, of Dunedin, New Zealand, was elected as Fellow; and Mr. John Slater, B.A., of Bedford-row, W.C., as Associate.

GREEK ART AND GREEK GEOMETRY.

The President invited discussion on Mr. John Pennethorne's paper, "The Connection between Ancient Art and the Ancient Geometry, as Illustrated by the Works of the Age of Pericles," read at the previous meeting (see pp. 183, 212), remarking upon the extreme refinement which the author had shown to exist in Greek architecture, extending even to placing a building in the best point of view, and arranging every proportion to suit that view. That these calculations were successful, the admiration of all subsequent ages had testified.

A paper, written by Mr. F. C. PENROSE, was read for the author by Mr. Cates. The author expressed his admiration of the research, thought, and careful measurements displayed by Mr. Pennethorne, in his researches into the optical refinements of the Greeks, and his regret at having to dissent from some of his conclusions, more especially that as to the supposed corrections for certain definite points of view. He had carefully tested, from three given points of view, Mr. Pennethorne's scheme, for the proportion of a Greek temple in three instances. In one of them he found the supposed corrections very closely coincided with the actual measurements; but in the other two he did not obtain nearly so satisfactory a result as was given by Mr. Watkiss Lloyd's method of proportions—a theory which he thought both simple and more likely to have been adopted by the Greeks. These points were illustrated by a number of comparative detail measurements, which Mr. Cates drew out upon the black board.

Mr. WATKISS LLOYD thought it would be

almost a shame to demolish a system on which Mr. Pennethorne had bestowed so much thought, ingenuity, and labour. He was, however, of opinion that neither the ancient author he quoted from, nor the actual buildings, confirmed the whole of the author's conjectures. The passages in Vitruvius referred to appeared to relate to the mimetic arts, especially to sculpture. It was clear, however, from these passages that attention was paid to optical effects, and entases were given to columns, square openings in lofty situations were designed as parallelograms, and what were to appear as circular openings as ellipses. He did not believe that these refinements were yet further adjusted to suit some one special point of view. His own theory as to their principles of designing, based on study and measurement of the principal buildings, was that the architect had first to consider the general proportions of the apartments into which his structure would be divided, and that he aimed at making these symmetrical and proportionate. Then he distributed these elements in accordance with his taste, and so as to fall in with a canon of numerical proportions governing the general arrangements. In the Parthenon the numerical canon was based on a difference of 5 between the two members. Thus the upper step on the longer and shorter sides, bore a proportion of 4 to 9; the entire height of front to breadth of upper step was as 9 to 14; the height of columns and architrave to same step as 4 to 9; and the entire height of facade to same step as 2 to 7. The actual measurements bore out these proportions not exactly, but within very trifling variations. The height of the column agreed with the breadth of the front with a difference of 1, given in favour of the column, and this rule was borne out by all the chief Greek temples.

Mr. H. H. STATHAM protested against architects allowing themselves to be overridden with figures. By cutting up the parts of a building into such small parts, and omitting the "slight discrepancies," some numerical series might be found by which the wildest Gothic cathedral would be reduced to system. The new point in Mr. Pennethorne's paper was, that he supposed Greek architects designed their buildings to be inspected from some one point of view. Incidentally he must take exception to the argument that the charms of architecture, like those of music, could be reduced to no fixed rules, for harmony depended on the synchronous recurrence of certain vibrations, whereas in architecture there was no corresponding law. He noted that three separate bases of comparison were taken—the upper and middle steps, and the podium; all could not, he thought, be right. Then the point of sight had been assumed at 45°; if so the Greeks were wrong, for the most complete view was obtained at 33° from opposite the centre. Further, if all these minute adjustments were calculated to suit, say, the north-western approach, they would mar the appearance from the south-eastern point of view. The explanation offered was that the pavement at the east end was so much broader than at the west, that when viewed from its edge this was set right—a suggestion with which he could not agree.

Mr. CATES, on behalf of Mr. Pennethorne, replied on the discussion, referring to the attack made upon Mr. Pennethorne's theory by M. Lesueur, who had attributed the variations in the Parthenon to settlements due to imperfect foundations, and had declared that in no case did a long line of building appear to sink in the middle, nor were any other optical corrections needed. At Athens, said Mr. Cates, an instance of want of attention to these corrections might be seen in the Academy of Fine Arts, built by Messrs. Hanson, of Vienna, and Ziller, of Athens. Every detail was carefully executed in white Pentelic marble, and with a refinement only inferior to the Parthenon. Yet the effect of the whole is heavy, the columns seem to lean, the entablature sinks in the centre, and the whole is distorted, simply because no regard was paid to optical corrections. The angle of 45 degrees might be a mistaken point of view, but that was the fault of Greek architects; the fact that all the principal temples were approached from such an angle gave colour to the theory. Perhaps if similar attention were given to architecture as had been devoted to music, the harmony afforded by certain lines and proportions might be established as a law in design. The systems both of Messrs. Pennethorne and Lloyd seemed to agree with measurements of Greek buildings, if they eliminated from every calculation certain unimportant frac-

tions. But since it would be allowed that the Greeks made many refining corrections in their works, was it not reasonable to go a little further and admit the possibility that they made such minute—often, perhaps, empiric—adjustments, as to render the appearance of a building more harmonious from given points of view?

The President having closed the discussion, invited Mr. J. K. Colling to read his paper upon "Architectural Foliage," but Mr. Christian protested against commencing, at 9.45 p.m., a paper which would occupy at least an hour to deliver. The President suggested the desirability of carrying out the programme, but by a show of hands it was unanimously decided to adjourn the meeting. The President announced that the next meeting would be special, and for members only, and that the next ordinary meeting would be held on March 21st, when Sir James Watson would read a paper on "Improvements in Glasgow." An endeavour would be made to enable Mr. Colling to read his paper the same evening.

ARCHITECTURAL ASSOCIATION.

THE INTERNATIONAL CONGRESS OF ARCHITECTS AT PARIS.*

(Concluded from p. 197.)

THURSDAY was devoted to an excursion to Rheims, and on Friday the question of competitions was discussed, when the following resolutions were passed:—1st. "That the Minister of Public Works be requested to reorganise the system of public competitions throughout France, and to place them on a basis such as would give satisfaction to the interests of artists, the common welfare, and the requirements of State administration." 2nd. "That the basis should consist of a series of rules defining the drawing-up of a programme, and the nomination of a jury consisting of architects, instead of leaving the selection and judgement to the prefects and mayors." The lecturer said he suggested that, as this congress was an international one, it would not be asking too much that the resolutions should be modified, so that they would be applicable in other countries. He doubted whether the prefects and mayors of France would give up their powers and rights of selection, especially when it was the money of their own provincial towns which was about to be spent. He also laid before the meeting a copy of the Institute rules, in which the utmost demand was that an assessor (an architect by profession) should assist the municipal authorities. Senor Bohnars and Herr Klein, the delegates from Spain and Denmark, deplored the mismanagement of competitions in their respective countries. M. Strohman, the Russian delegate, contended that architects should be placed on the Committee of Adjudication, and that competitors ought to be allowed to appear before this committee, not only to explain their own designs, but to criticise those of other competitors. On Saturday, at a sectional meeting, a letter was read from the Commander da Silva, president of the Architectural Society of Lisbon, describing the cathedral at Batalha and its late restoration. This cathedral is especially interesting to us, as it is considered the architect must have been an Englishman, from its resemblance to some of our minsters. It was built towards the end of the 14th century by King John I. of Castille, who imported a large number of architects from all countries, so that a building should be constructed which should be without a rival. It has just been restored by the Chevalier Santos Periera. The concluding meeting of the Congress was held at the Trocadero in the afternoon. The chairman, M. Guillaume, member of the Institute of France, and Director of the Ecole des Beaux Arts, distributed the medals and prizes given by the Société Centrale des Architectes. The large number of prizes given by the Academy of France and the School of Fine Arts render it unnecessary that the Société Centrale should hold any further competitions or give prizes to students. It takes up, therefore, another field, that of rewards for executed works. It is now five years since these were instituted, and there seems to be no ill-feeling or jealousy created as to their justice of decision. There are two classes of prizes—those given to architects for the best specimens of domestic architecture erected within a certain number of years, and those to workmen employed in the

* A paper read by R. PHENE SPIERS, F.R.I.B.A., on February 14th, 1879.

building trade, and to manufacturers of special wares used by architects. To facilitate the distribution of the second class of awards, all the architects of Paris and the provinces are requested to report to a committee of the Société the names of any contractors or workmen who have executed work under their order worthy of special notice. These "contractors" are not the capitalists and speculators of our country, but the actual workers themselves, independent foremen of each trade. The committee's choice has to be approved of by the council of the Société. The principal rewards given this year were as follows:—M. Henri Blondel and Charles De la Lande, architects, of Paris, and M. Gosset, architect, of Rheims, were awarded medals for their executed designs for Domestic work; M. Henri Révoil, a medal, for a work on the Romanesque architecture of the south of France; M. Metz, architectural expert, a medal, for assistance rendered in the Courts of Justice; M. Homolle, the society's large bronze medal, for archaeological excavations in the island of Delos; to M. Dutheil, stonemason and "pie-quer" (setter-out of masonry), who passed a brilliant examination in stereotomy, a silver medal was awarded; and to M. Dumnain, stonemason, a bronze medal; the next medal was given to M. Delhomel, aged 73, who in 1829 entered the service of the contractors for the restorations at Amiens Cathedral, and for 45 years has been the foreman mason employed in setting the stonework of the cathedral, having been commended for his exactitude, intelligence, and his upright character by the various architects superintending the work; to M. Banet, described as "good builder," was awarded the next medal. It is recorded of him that when the great demolitions were commenced in Paris about 30 years ago he was employed in the work, being allowed to sell for his own benefit the materials pulled down, that being his reward for his trouble. Finding his benefits to be too great, after deducting what he thought was a fair remuneration for his services and risk, he offered the remainder to the municipality, who, finding that there was really a considerable profit in the undertaking, since that period have put up to auction the privilege of demolition. To his chief foreman was awarded a bronze medal. To M. Baudet, civil engineer and constructor of ironwork, who carried out the iron construction of the roof of the National Library and other public buildings, a silver medal; and to his pupil and chief foreman a bronze medal. To M. Meril, forger of wrought-iron work, a silver medal, and to his foreman one of bronze. To M. Bernard, working joiner of Lyons, a silver medal. To MM. Geneste and Herschen, civil engineers, manufacturers and patentees of ventilating and warming apparatus, silver medals, and to their foreman a bronze medal. Those who have visited the Palace of Versailles will remember the magnificence of the lead cresting which surmounts the chapel roof. This has recently been restored under the superintendence of the lecturer's former professor and principal, M. Questel, the architect of the Palace of Versailles, and to the chief plumber and his foreman were awarded a silver and bronze medal respectively. Two other medals, given to M. Parville and M. Leibnitz, the manufacturers of the glazed terra-cotta work used in the decoration of the loges in the centre of the Exhibition buildings, concluded the list of rewards. It must be remembered that it is the custom in France to entrust the different trades of a building to different specialists. This increases the labour and difficulties of the architect, but it has the counter advantage that the specialist contractor, who in many cases is still the actual worker on the building, has the subject at his fingers' ends; he takes a great interest in the work, and can execute it at much less cost than a large contractor, being content with a smaller profit. The last address at the congress was by M. Desjardins on the Campagna of Rome, and the proceedings terminated with a banquet at the Grand Hotel. As to the results of the Congress, Mr. Spiers said he did not think much practical benefit was effected. It would have been more useful if the preliminary arrangements had been more carefully thought out. Scarcely the titles of the papers were known before the meeting, and each reader commenced his discourse with an apology for what he called "the tyranny of the title." The chairmen and other officers were not chosen till the meetings commenced, and then half-an-hour was lost in the appointment. The

resolutions were not formulated in advance; in some cases were scarcely put in a definite form. No committees were appointed to continue the work, and one's only astonishment is, that so much was got through; so many excellent, if too theoretical, addresses delivered; and so much interest and sympathy awakened in these who took part in the proceedings.

Mr. RIDDETT, in proposing a vote of thanks to the lecturer, remarked that it was gratifying to learn that the conduct of public business was not one of the things which they did better in France. The relations and distinctions between the architect and the engineer appeared to have been fully discussed. It was clear that until the engineer became more artistic and the architect more scientific in their constructions there could be no usurpation of each other's provinces. Mr. Spiers had mentioned that clerks of works were unknown in France. The position of a clerk of works was anomalous; he was generally chosen from a class of men who had been all their lives in a builder's employ, and he feared architects did not always get what they wanted from him. He trusted the custom would grow of having in his stead a resident architect on the works, who would, at the same time, be gaining valuable experience for after practice. The French system of contracts was very different to ours. There were indeed no contracts, but the work in each trade was carried out by a separate workman at so much per cent. below the municipal schedule, and as the whole was measured up at the close, it was not to be wondered at that in the architect's scale of charges was a fee of six francs per hour for settling the differences which might arise. With the vote of thanks he would couple another to Mr. Spiers and their President for so ably representing the Association at the Congress.

Mr. CLARKSON seconded both votes of thanks. He did not entertain the fear that the architect's work was likely to pass into the hands of the engineer in this country, for the engineer's province was restricted to constructions of a utilitarian character. There was no doubt, however, that the very large amount of ecclesiastical work which had fallen to the architects during the past five-and-twenty years had been somewhat prejudicial to the profession; but there was now a tendency to require that young architects should divert their attention from the examination of old works to the study of modern problems of construction and design, and of contemporary buildings. The new Post-office buildings in St. Martin's-le-Grand had been incidentally alluded to as the work of a Government engineer. That was hardly correct, for the Mr. Williams, their architect, was one of the Fellows of the Institute, and a duly qualified member of the profession, although he had the misfortune to be in official employ in connection with the erection of Post-offices throughout the kingdom. The system of a uniform scale of percentages appeared to have been considered at the Congress as unfair, but this was not the case; the young architect who had but a small practice gave a larger amount of attention and thought to each building than the man at the head of his profession could afford. Architects of large practice ought, he thought, to weed their business and only take large and important works. As to diplomas, in England these were not half so much value to the public as to the profession; it would force men to go through a regular curriculum and would give them the power and mastery over their work which resulted from labour devoted to study.

The PRESIDENT, in putting to the meeting the vote of thanks to Mr. Spiers, intimated that the remarks of their representative were listened to with great interest and attention at the Congress. With all its defects, he believed the Congress would have a very good effect; the subjects were all practical and had a direct bearing on the profession. The mode of subdividing the contracts in France led to far more attention being paid to the work than prevailed in England, and the result was satisfactory although it entailed in supervision a vast amount of trouble upon the architect. Some modification of the two systems might perhaps be found practicable in this country. He then put to the meeting the vote of thanks, which was carried by acclamation, and responded to by Mr. Spiers, who further explained the workings of the Parisian schools of fine arts and design, and the French system of contracting.

COLOUR IN ARCHITECTURE.

A PAPER upon this subject was read before the Birmingham Architectural Association, on the 11th inst., by Mr. J. W. Tonks. Modern building, he remarked, was, before all things, utilitarian; but while the architect was expected in the first place to produce the greatest results at the least possible cost, there was also a desire for what was beautiful, and an emulation to obtain the most ornate or beautiful buildings, existing not only amongst municipalities, but amongst the owners and occupiers of dwelling-houses. The problem before the architect was how to produce satisfactory and pleasing structures without unduly increasing the cost, and this must be solved in one or all of three ways—by variation of the sky-line, by the recess or projection of portions, and the enrichment of surface. The play of contrast in the roof-line could be obtained in Gothic by pinnacle, parapet, cresting, and slope of roof; in Tudor and Elizabethan by an enlarged variety of expression and clustered chimneys; in Palladian by cupolas, pediments, and pavilions; and even in Queen Anne by hat-boxes of quaintest form and roof accretions. There were four styles in art. Some variety of sky-line could be introduced with advantage by the architect. The second mode of light and shade in architecture by recessing or projecting parts of the frontage, presented great difficulties in execution to town architects; no encroachment could be made upon a street front, and land was too valuable to be sacrificed in unnecessary recesses. The requirements of light also militated against this mode of treatment, but something might be done by means of column, cornice, parapet, and even verandah. As to the third requirement of *chiaroscuro*, little need be said of the enrichment of surface by moulding or carving. The tendency to decorate was usually sufficient to carry the designer to the full length of his client's purse. To be effective, ornament must be in its place, it must supply a want, and it must not obtrude itself unduly. The last method considered was the actual use of colour in external architecture. Iron, brick, wood, and stone all admitted of a certain amount of distinctive surface effect and colour. When the building was new, or in the case of wood and iron, when fresh paint had been applied, the result might be satisfactory, but the atmosphere of a manufacturing town would soon efface all expression, and all these materials faded under the influences of smoke and rain to uniform hues. The question arose whether coloured surfaces could be employed which would be impervious to both influences. The polished surfaces of granites and coloured marbles were but slightly affected by the atmosphere, and these materials afforded a basis of distinctive colour, but the use of these were necessarily restricted by their expense. Mosaics were a still more costly luxury, but will probably play a more important part in the future than they had done in the past. Mosaic was now being introduced into the decoration of a public building at Birmingham—in the central arch of the front of the Council-house. The use of terra-cotta of different colours was now common on the Continent, although but little adopted in this country. It was being used on a small scale and with good effect in the School Board offices and the Grand Hotel in Colmore-row, Birmingham. A little harshness of colour was pardonable when the material was being introduced, for it would speedily tone down, and an architect's impetuosity and foresight in designing and construction would add to his reputation in after years. Majolica ware and faience had been freely employed in the Pavillon de Ville de Paris at the recent Exhibition in that city, a building designed by M. Bordouard, and intended to become permanent as a gymnasium. It was composed of a framework of iron, clothed with bands of brickwork, terra-cotta, majolica tiles, or slabs. The age of frescoes for external decoration had, the author considered, gone by, although it would still be used in the interiors of important buildings; the begrimed, plague-stricken effect of an old fresco on a decaying wall was depressing. Painted pottery was in a different case; it would not lose colour, and a broken tile could be replaced; it did not retain dirt and could be easily cleansed, and any tint or tone could be obtained by its use. When or where to use it would require careful consideration by the architect.

SANITARY SCIENCE AT THE SOCIETY OF ARTS.

THE Council of the Society of Arts have formed a Sanitary Section, and have appointed the following gentlemen as a Committee in charge of it:—Mr. F. A. Abel, C.B., F.R.S.; Mr. R. Brudenell Carter; Mr. E. Chadwick, C.B.; Mr. Henry Cole, K.C.B.; Major-Gen. Cotton, F.R.S.; Captain Douglas Galton, C.B., F.R.S.; Mr. Coghlan McHardy; Mr. Robert Lawlinson, C.B.; Dr. B. W. Richardson, M.A., F.R.S. The Committee will meet periodically for the discussion of sanitary subjects. Communications of a suitable nature are invited. The annual Conference will be held in the rooms of the Society of Arts, on Thursday and Friday, the 15th and 16th May, 1879, on National Water Supply, Sewage, and Health, the Right Hon. James Stansfeld, M.P., late President of the Local Government Board, in the chair, assisted by the members of the Executive Committee.

PROGRAMME OF PROCEEDINGS.

The conference will meet each day at 11 a.m., and sit till 1.30, then adjourn till 2, and sit again till 5 p.m., and, if necessary, meet again at 8 p.m.

Thursday, 11 a.m.—Opening of the Proceedings by the Chairman.

Papers and Discussion.

Friday, 11 p.m.—Proceedings will be resumed. Papers and Discussions continued.

There will be an Exhibition of Mechanical and Chemical Apparatus in connection with Water Supply, Treatment of Sewage, and Health. All articles for exhibition must be delivered, carriage free, not later than Saturday, the 10th May, 1879. Manufacturers and others desiring to exhibit should communicate forthwith with the Secretary of the Society of Arts. Papers on any of above heads are requested. The object of the Conference is to discuss existing information in connection with the results of any systems already adopted in various localities, referring to the subjects of National Water Supply, Sewage, and Health; to elicit further information thereon; and gather and publish, for the benefit of the public generally, the experience gained. The introduction and discussion of untried schemes will, therefore, not be permitted. The papers accepted for the Conference will be printed and circulated at the meetings.

The Council have determined to offer the gold medal of the Society, and three silver medals, for the best suggestions, founded upon evidence already published, for dividing England and Wales into watershed districts, for the supply of pure water to the towns and villages in each district. The suggestions must be sent in to the Society's office on or before the 26th April, so as to be discussed at the Conference. The details of the conditions will be issued immediately, and may be had, when ready, on application to the Secretary of the Society.

HOUSEHOLD SANITARY ARRANGEMENTS.

ON Monday evening, at the Society of Arts, Dr. W. H. Corfield, M.A., delivered the second of a course of Cantor Lectures, on "Dwelling Houses: their Sanitary Construction and Arrangements," the subjects treated of this evening being "Ventilation, Warming, and Lighting." As on the previous occasion, the lecture was illustrated by various specimens and models from the Parkes Museum of Hygiene. Dr. Corfield commenced by an account of the way in which air is polluted by respiration, far more by the putrescible organic matter discharged into it than by the diminution of oxygen or the increase of carbonic acid. The amount of air necessary for each person per hour is 3,000 cubic feet, and as the air can only be changed three or four times an hour without draught, it follows that each person must have from 750 to 1,000 cubic feet of space; and this must be properly distributed, for it is evident that a man could not live in a space one foot square, and 1,000 feet high; any height above eleven feet should not be considered in estimating the air space of an ordinary room. Ventilation is divided into two kinds—natural and artificial. Natural ventilation means those methods which make use of the ordinary physical forces of nature which allow air to go in certain directions. Artificial ventilation means the forcing of air into buildings or drawing it out by steam-engines, water-

power, horse-power, &c. Ventilation by fires and lights forms a connecting-link between the artificial and natural methods. In order that air may be changed there must be openings for the pure to come in and for the vitiated air to go out. A considerable quantity of air goes out by a chimney whether there be a fire or not. It is of extreme importance to have windows on both sides of houses, so that the air may go straight through them. Sylvester's plan for the ventilation of large houses was by means of a cowl always facing the wind, on a pipe which carried air into a cellar where it was warmed by stoves, and then passed through apertures into the various rooms and out by an exit shaft. Dr. Richardson improved the cowl by utilising the aspirating power of the wind upon the same principle as the spray producers on scent-bottles. Air outside being colder, is heavier and exerts greater pressure than air inside a house. If a hole be bored in the wall of a room, air will come in as water would. Window sashes can be made to act as ventilators. Dr. Hinxes Bird's plan was to open the lower sash and fix in a well-fitting block of wood. This left an opening between the sashes in the middle of the window, and the air was admitted in an upward direction. One objection to this plan was that people seeing the window open complained of draught; another objection was that it did not purify the air. Another plan was to cut pieces out of or bore holes in the lower board of the upper sash, these holes might be filled with cotton-wool, and blacks would thus be kept out. Currall's lower-sash ventilator is a metal plate in front of the lower bar of the lower sash, admitting air in an upward direction. A model of an automatic fastener, invented by Messrs. Thompson and Sons, of Birmingham, was exhibited and explained. It allowed a window to be opened any distance at top or bottom, and always held it fastened. Louvre ventilators were next spoken of. If a window be pulled down a little at the top and a Venetian blind let down, with the louvres sloped upwards, that answers perfectly well. Moore's ventilators are glass louvres in a metal frame. They ought to be in the lower panes of the upper sash, but are generally fixed too high. Inlet openings ought not to be near the ceiling. Sashes may be made to fall in and form immense louvres; and such are in use at Willis's Rooms. Double windows are sometimes used to avoid having a cold stream of air near the window. French casement-windows are not suitable for this climate. If they be used some kind of louver ventilator is necessary. One of Cooper's ventilators may be used, being a circular disc of glass with five holes in it, and corresponding holes in the frame behind; the disc turning on an ivory pivot. Inlets through walls may be provided with a sloping board in front, having sides or cheeks. The inlets should only be just above a person's head. A metal box of this kind was shown, having a balanced metal flap, easily moved by a cord. Several small ventilators are better than one large one. A drawer ventilator was next exhibited, being a box to be fixed in the wall, having inside a drawer fitted with metal plates for giving an upward direction to the air. Perforated zinc is sometimes used with the idea of filtering the air; but it is better to have simply an iron grating which will keep out birds. Filtering may be effected by cotton wool, a spray of water, or some other means. A ventilating inlet in a door is sometimes useful, but conversation in the room can be heard outside. In Tobin's system of vertical tubes, a horizontal pipe, with a grating outside, comes through the outer wall into the room, where there is a vertical pipe about six feet high, from whence the air rises up in a column. Valves, or trays fitted with plates, and holding water to filter the air, may be added. A long raised muslin bag may be inserted, and this would separate a great deal of impurity from the air. Ellison's conical ventilators contain simply conical holes, which are placed with the small end outside and the large end inside the house, whereby, it is said, much less draught is occasioned. A conical siphon is also suggested. Of exit openings chimneys are most important. If they be not higher than surrounding buildings cowlings are sometimes necessary. Fixed cowls are generally better than movable ones, but were not always effectual. Dr. Arnott's exit valve consists of a light metal flap swinging on a hinge at its lower edge, and so weighted that it balances. It has two disadvantages: one being that it opens directly into the chimney flue; the

other that it makes a noise; but a valve was shown and worked which made a noise hardly perceptible. These valves might be very properly used in situations not leading into chimneys. Fire-clay flues are being made by Doulton, in which the chimney heats the air in two tubes and causes an up-draught from rooms connected with them. These flues are better with valves, especially where the flues are not always in use. Boyle's exit valve is an improvement upon Arnott's, and consists of a series of small tale flaps. Benham's plan is one for carrying off products of combustion of gas and vitiated air from the upper part of the room at the same time, but by different pipes, fresh air being brought in from another direction. A model and drawing of this arrangement were shown and explained. Verity's system of artificial ventilation, recently applied in the Reform Club, uses water from a cistern as the moving power. The water from a pipe strikes against a wheel, and turns a ventilating-fan at a considerable rate, by means of which air could be forced into a room or drawn from it, passing along a tube, in which, if used as an inlet, ice, or a disinfectant or deodorant might be placed. For want of time, the subjects of lighting and heating will be considered at the commencement of the next lecture, when the subject of water supply will be taken up.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the meeting last week, Mr. Thomas Morgan, F.S.A., in the chair, further discoveries connected with the Roman villa at Ichen Abbas, a small Norman church, once belonging to St. Mary's Abbey, at Winchester, were communicated by Mr. E. Loftus Brock, F.S.A. The villa, which was small, must have been one of great beauty, and faced the south-west. The plan of the portion of the excavations already made shows it to be about 50ft. by 15ft., with an extension to the east. In this small square there is a passage, approached by what has been apparently an arch of some elegance, since the basis of stone columns remain. There are four apartments connected with this passage, three of which are paved with tessellated floorings of good design, the one in the third room being very fine, with a centre figure representing Flora. The colours of the tesserae are well-preserved. A large quantity of wall plaster has been found, the greater portion nicely ornamented, with the colours as fresh almost as when first applied. The fourth apartment has not yet been excavated, but trial shafts have not revealed pavement of any kind, so it is probable it never was so ornamented. No more coins have been discovered, though plenty of pieces of pottery of various kinds, and mostly indicating vessels of very beautiful forms, are constantly met with. Workmen lately employed in making drains for the sewage of Winchester have come upon a portion of a very elegant Roman pavement, of which the colours are very bright and well-preserved, and this pavement, with the above remains at Ichen Abbas, the many still existing at Winchester (*Venta Belgarum*), the pavement at Bramdean, and the extensive remains in Lord Northbrook's plantation near Micheldever, sufficiently prove how widely and thoroughly settled were the Romans in and near the valley of the Itchen. A paper was read by Mr. George Patrick upon "Burghley House," illustrated by a series of old drawings. The chairman announced that the Council had resolved to undertake some further explorations at Castor, commenced 50 years ago by Mr. Artis, whose valuable work on its pavements, altars, and other interesting Roman remains is so well known, and solicited the aid of the Association and the public generally, by way of a private subscription, for carrying out so desirable a work.

Messrs. Wm. Furness and Co., of Liverpool, have introduced a most convenient and economical glue heater, heated by means of steam. The glue-pots, which are of copper, fit into a cast-iron casing divided by partitions, so that any or all of them can be used as desired. The large oval pot will take a cake of glue without breaking, and is used to supply the smaller ones. The pots are surrounded by water, in which the steam blows, over-flow pipes being provided. A steam pipe runs along the front of casting with separate cock into each compartment. There is also a pet cock for drawing hot water to make the glue the right consistency.

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ST. MARY'S R.C. CHURCH, BATH.—ST. BARNABAS' CHURCH, BECKENHAM.—ART UNION OF LONDON NEW PREMISES.—NEW WAREHOUSE AT BELFAST.—PORCH AT LINCOLN CATHEDRAL.—A WAYSIDE INN.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SOUTH PORCH, LINCOLN CATHEDRAL.

The porch on the south side of the choir, known as the Presbytery entrance, is a beautiful, and in England rare, if not unique, example of the porches so common in France, and though inferior to the best of them in size and richness of decoration, is altogether an excellent example of the period. The chief object of interest is the doorway, the sides and arch-mouldings of which are very much enriched with rows of figures and strings of foliage alternately; presenting every variety of surface to the fleeting light and ever-changing shade, and showing gradations of colour quite impossible to do justice to in a pen-and-ink drawing. The alto-relievo over the doors embodies the idea of the last judgment (as described in the 25th chapter of St. Matthew's Gospel), and was evidently executed by a sculptor not unacquainted with the excellences of ancient art. The arrangement of the subject is very praiseworthy, from the importance given to the central figure, the Supreme Judge of Man, by its size and situation, in which circumstance it possesses almost a peculiar merit, since the great masters, both in sculpture and painting who have treated the subject, have usually made the Divinity secondary to the display of character in the objects of hope and despair. Mention is made of this alto-relievo in Flaxman's lecture on composition, and an illustration of it appears in his work. The four statues in the piers of the porch are the four Evangelists, and were no doubt the work of the same hand, as the superior portions of the rest of the work. It is probable that a statue of the Virgin and Child was placed on the middle pier, as at the entrance to Lichfield Cathedral, which is of the same age and style. The chapels at the sides of the entrance, which are very nearly alike, though by no means adding to the beauty of the early work, are nevertheless good examples of the Perpendicular style. That on the east side is the chapel of St. Blaise, built by Bishop Russell, who died in 1494, and on the west is the chapel of St. Catharine, built by Bishop Longland, who died in the early part of the 16th century.—W. H. W.

ST. MARY'S CATHOLIC CHURCH, BATH.

This new church is being built for the Very Rev. Canon Loughman, from the designs of Messrs. Dunn and Hanson, of Newcastle-upon-Tyne, to replace an old one known as the "Upper Chapel," in Montpellier, Bath, which was formed some years ago out of stables belonging to the riding-school, into a temporary church. The new building is situated in the Julian-road, about three hundred yards distant from the old one. In plan, the church consists of a nave 76ft. by 22ft., and with a south aisle has a total width of 36ft. 6in., a sanctuary 33ft. 6in. by 22ft., side chapel 27ft. by 13ft., and sacristies 39ft. long, with sacristan's-room and organ-chamber above, the latter opening upon side of

sanctuary with an arcade of four arches. The whole is being built, inside and out, of Bath stone, with the exception of red Mansfield columns in the nave, and red granite in the sanctuary. The clerestory runs at same height along both sides of the church, and below it, on the north wall, are stone panels, to be filled with paintings. The roofs are all of dressed pitch-pine, that of the sanctuary being groined up to a large moulded purlin, over the clerestory of five windows. The central portion is a pointed barrel vault divided into panels with carved bosses at the intersections of the mouldings. The contract is being carried out by Mr. Joseph Bladwell, builder, of Bath.

ART UNION OF LONDON NEW PREMISES.

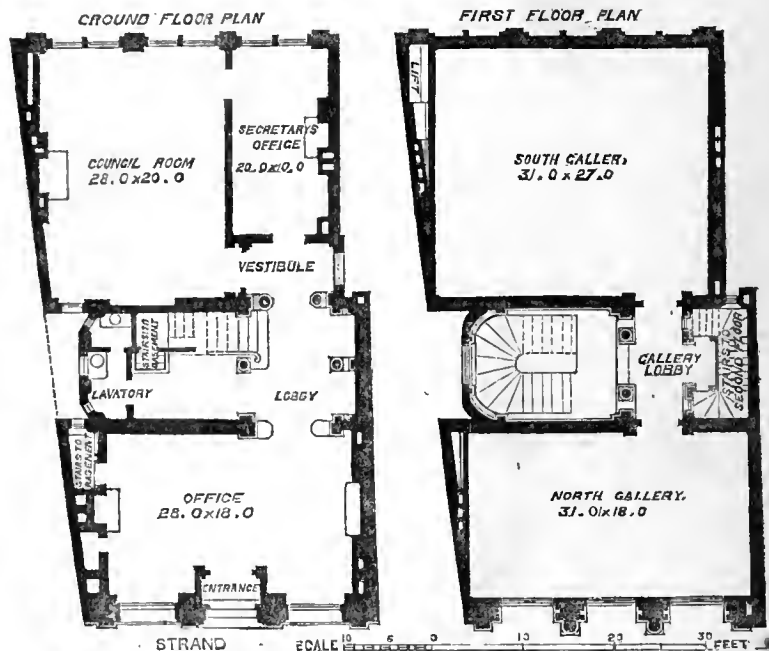
THE Art Union of London, instituted in 1837, has found its operations successful to such an extent as to require enlarged arrangements for the transaction of its increasing business. Having set aside a fund for the purpose of acquiring suitable premises, the Council lately decided to invest the same in the erection of a new building in the Strand, on the Savoy Estate. They decided that the architecture should be Palladian in style, and intrusted the work to Mr. Edward

ST. BARNABAS' CHURCH, BECKENHAM.

WE give this week another illustration of St. Barnabas Church, Beckenham, Kent, to be erected in a portion of the parish, to which a new district has been assigned. The site is on rising ground, a short distance from the main road from Beckenham to Bromley. The foundation for the chancel have been put in, and a memoria stone, which will be immediately under the altar was laid by Earl Nelson on June 11th, 1878, a President of the Free and Open Church Association. The church will be constructed of Kentish rag stone for the external walls, with Godstone freestone for internal ashlar; the wall between the Kentish rag and freestone being filled in with concrete. Red Dumfries stone will be used for the shafts, bands, &c. The chancel will be groined. The church will seat about 1,000 persons. All the seats to be free, and the estimated cost £18,000. Messrs. Alex. R. Stenning and Henry Hall, of 27, Fenchurch-street, are the architects, the work being personally superintended by Mr. Alex. R. Stenning.

WAREHOUSE IN DONEGALL-PLACE, BELFAST.

THIS building has been erected in place of one destroyed by fire about two years ago, for Messrs.



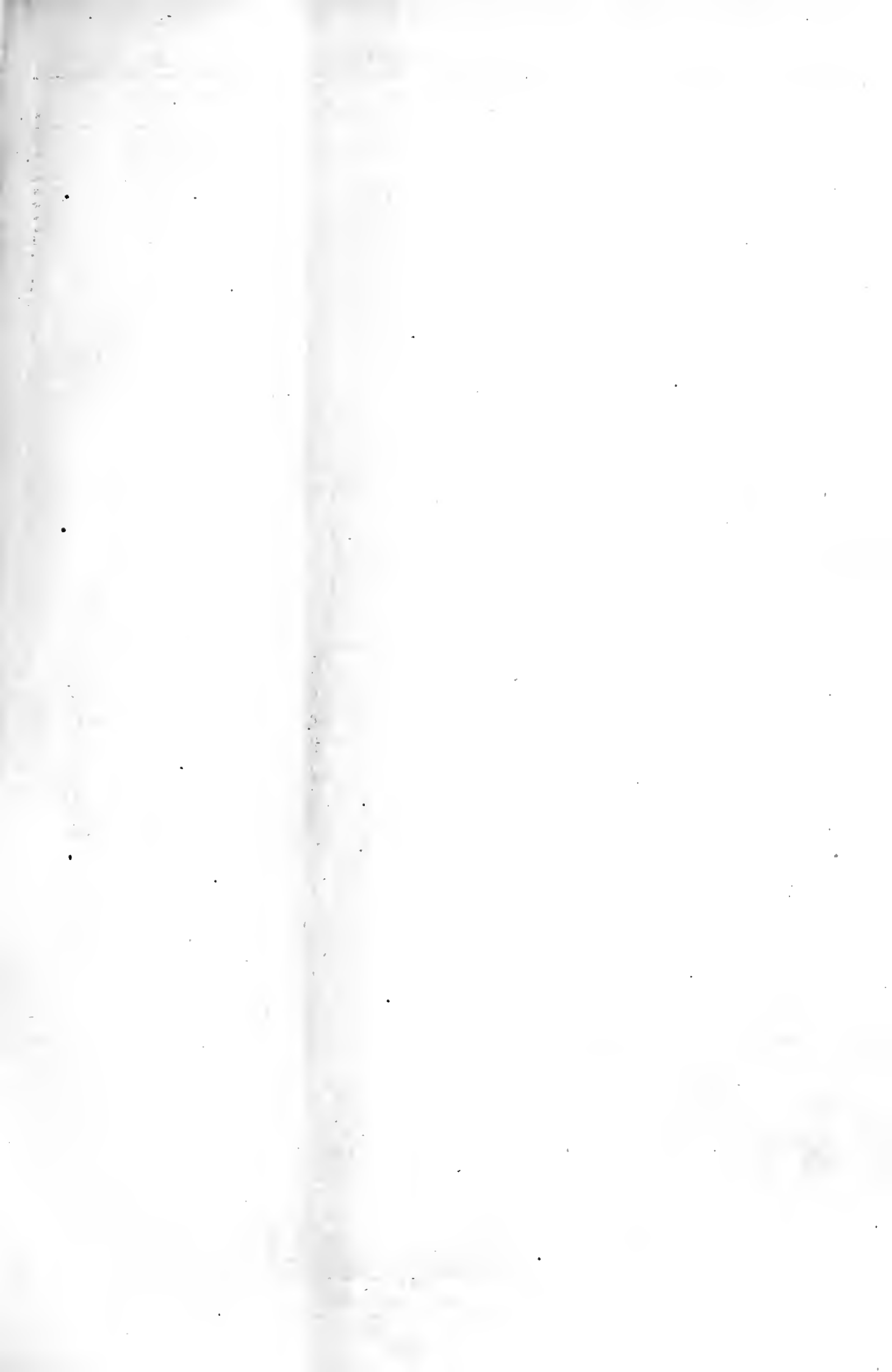
M. Barry, R.A. The new building contains, on the ground floor, a front office or shop, and at the back, a council-room and a room for the secretary, looking over the ground attached to the Savoy Chapel. The first floor is occupied by two galleries for the exhibition of pictures and sculpture. The front gallery, towards the Strand, is lighted by the three arched windows of the principal story. The other, and larger gallery at the back, has a top light only. The basement is occupied by carpenters' workshops, packing-rooms, and stove-rooms, and there is also a sub-basement, which was rendered necessary by the great depth of the foundations. The building rests upon a continuous bed of concrete, about 3ft. thick. The front is of Portland stone throughout. The principal story is marked by the employment of a Corinthian order of columns and pilasters, with arched windows deeply recessed. The spandrels over the windows, and the pilasters, are carved with subjects suggestive of the practice and influence of the fine arts of painting, sculpture, and architecture. The device of the Art Union, used on seals and official documents, is carved in low relief on a circular shield in the tympanum of the pediment over the doorway. The site has presented some irregularities and difficulties with respect to light and air, which have affected the arrangement of the plan. The contractors are Messrs. Perry, of Tredegar Works, Bow, who expect to finish the building before midsummer next. The sculpture has been executed by Messrs. Mabey, of Prince's-mews, Westminster. Mr. House is the clerk of works.

Lindsay Bros., wholesale warehousemen, Belfast. The building contains nearly an acre of floor space. The top floor is to be used for cooking, dining-rooms, &c., for the employees of the firm, and the remainder of the building for warehouse purposes. The enrichments of the front are of terra-cotta, from Messrs. Johnson and Co., Keymer Junction, Sussex. The builder is Mr. Robert Corry, Belfast; the clerk of the works Mr. Jas. Moore; and the architect Mr. Robert Watt, of Belfast.

A WAYSIDE INN.

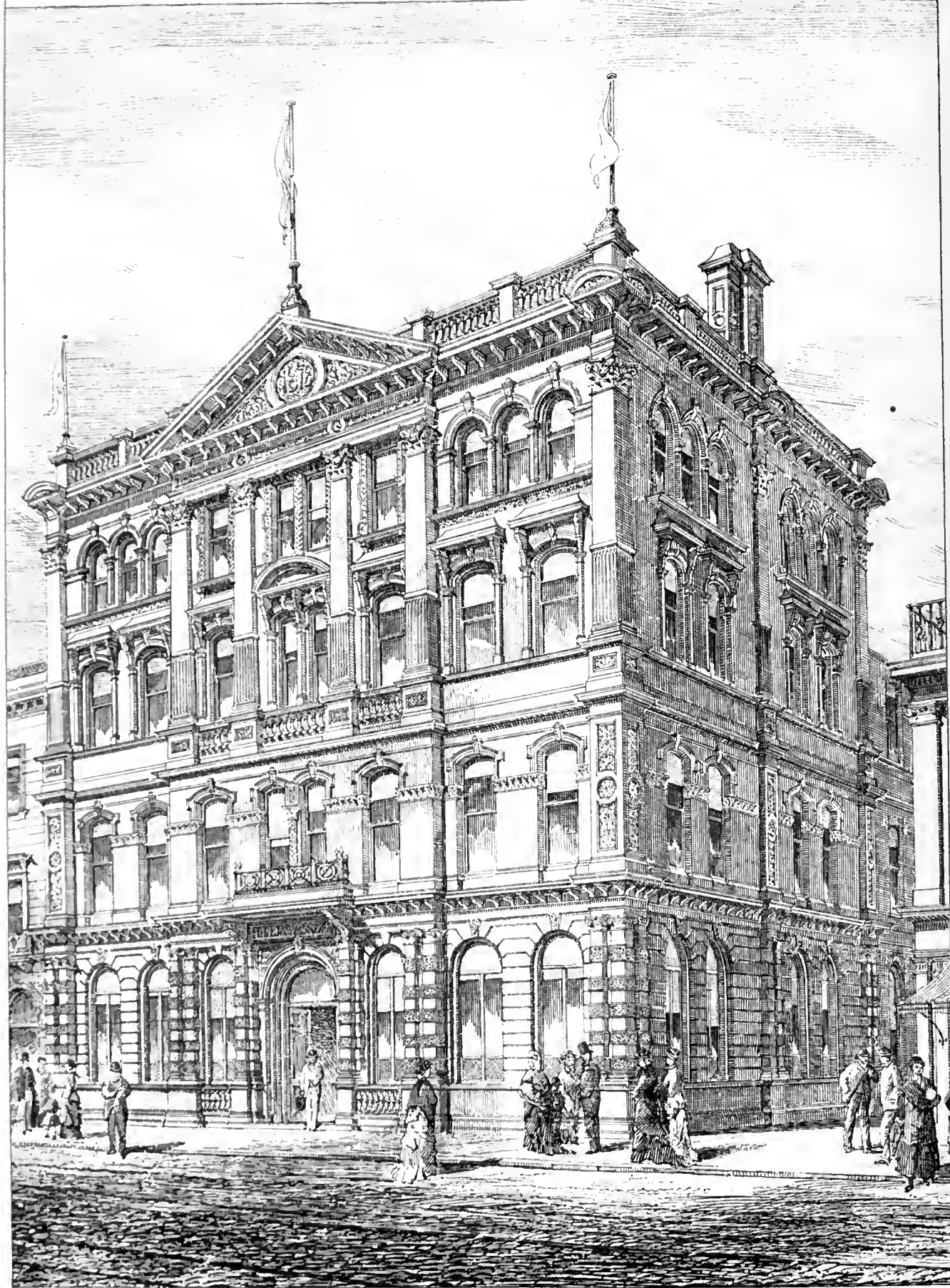
A fortnight since we published the design placed first in the competition for a wayside inn, and to-day we present our readers with the drawing, by "Meehlin," whose design obtained the position of second in order of merit. This position, as we have already said, is chiefly due to the appropriate architectural treatment employed, though the plan has also points of merit.

The owners of St. George's Church, High-street, Borough, were last week, at the Southwark Police-court, summoned by the Metropolitan Board of Works for an order to take down or otherwise secure the head of the south-west door and the west front of that edifice, and to secure the brick and stone work of the front or flank walls. Evidence was produced proving that the portions of the church mentioned were in a cracked and otherwise insecure condition, and that no attention was paid to notices intimating the dangerous state of the structure, which were served at the church by the district surveyor. Mr. Partridge made an order for the necessary repairs to be carried out in six weeks.



THE BUILDING NEWS, FEB 28, 1879.

New Warehouse Donegall Place Belfast for Messrs. Lindsay Bros.



R. CORRY, BUILDER.

JAMES MOORE, CLERK OF WORKS.

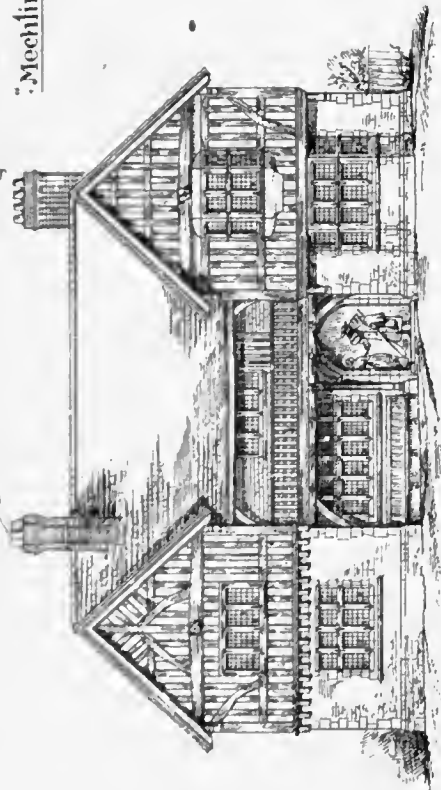
Robert Watt ARCHITECT

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

BUILDING NEWS DESIGNING CLUB

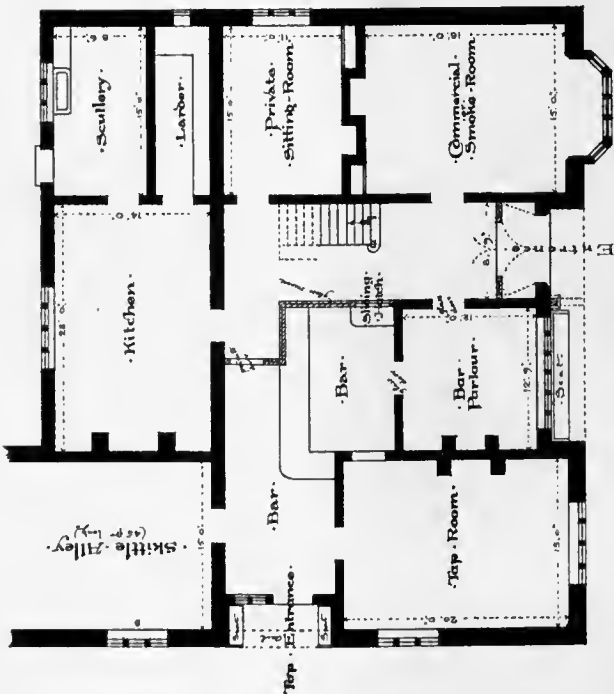
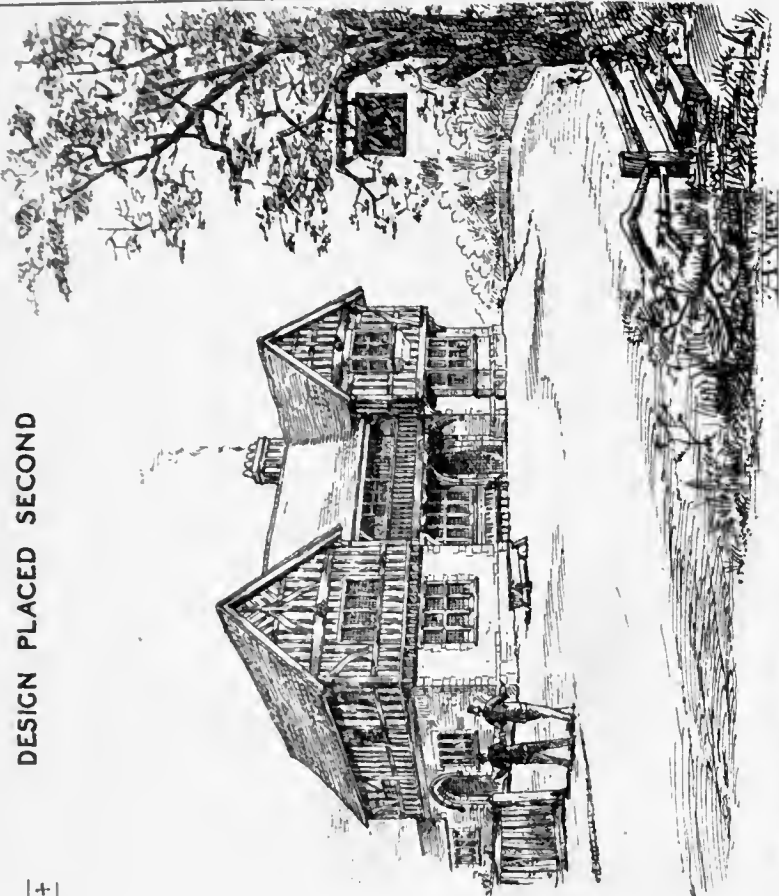
7A Wayside Inn

Mecklin



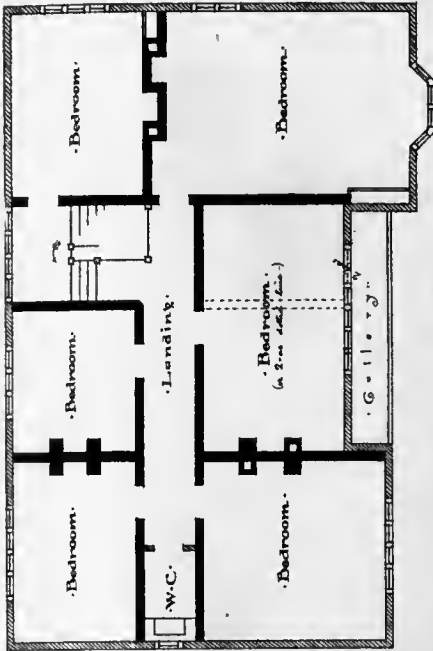
Front Elevation

DESIGN PLACED SECOND



Ground Floor Plan

Note: The accommodation is only provided in connection with the Tap Room and Scullery. The Private Sitting Room, Commercial Smoke Room, and Bar Parlour are used for the Bar Room and for the Bar Room.



First Floor Plan

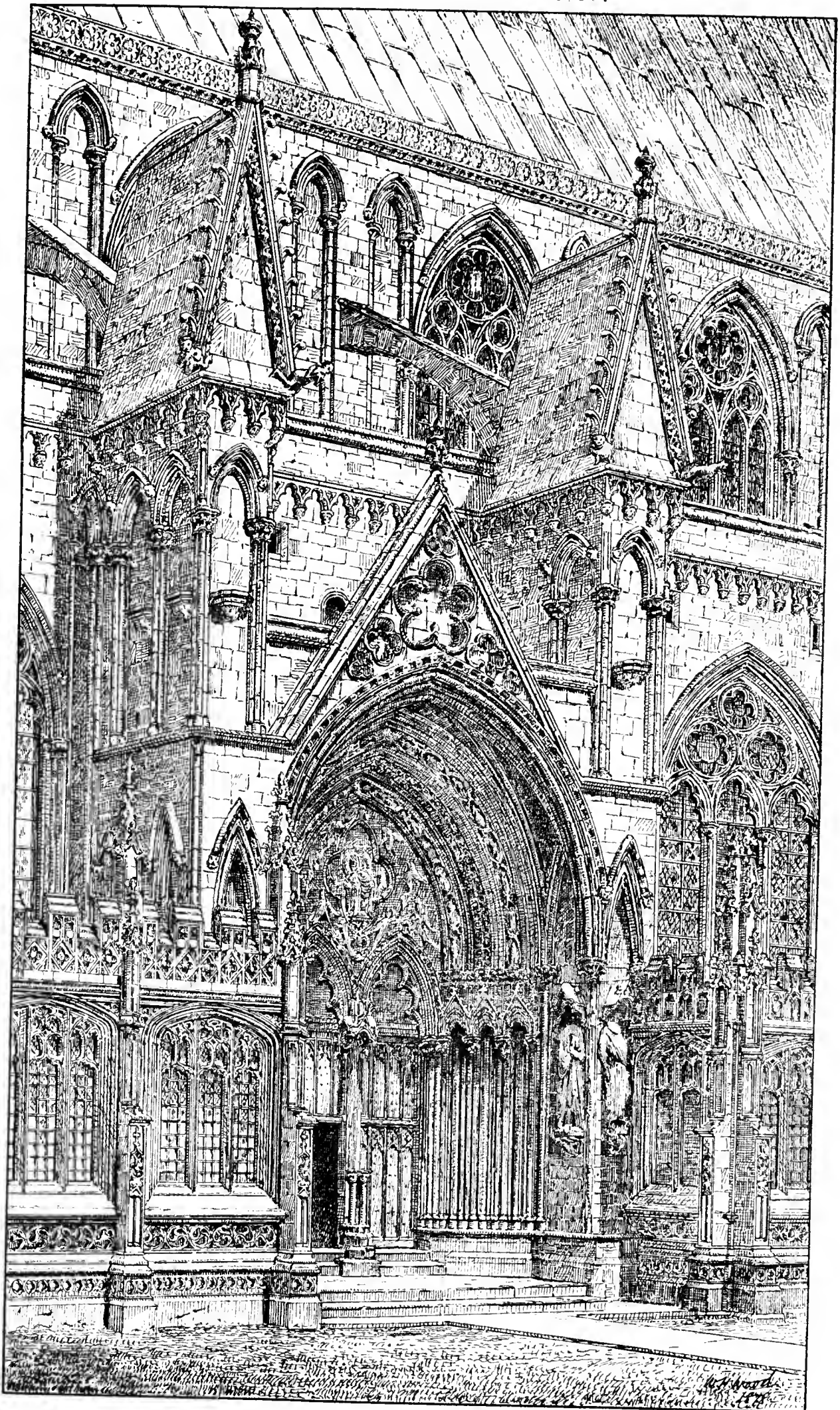


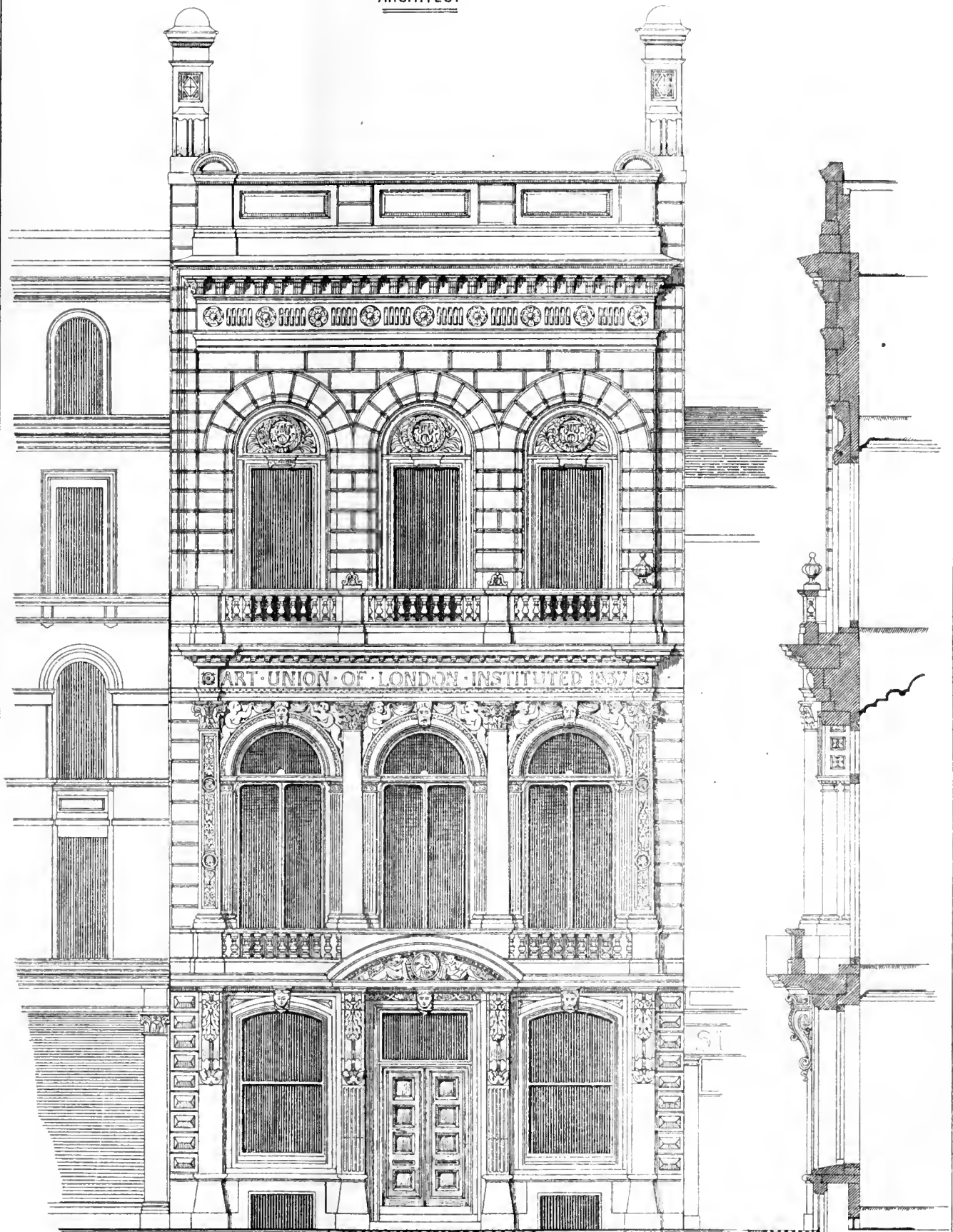
Photo Engraved & Printed by James Akerman, 6, Queen Square, W.C.

*Porch on South side of Choir: Lincoln Cathedral.



ART UNION OF LONDON * NEW PREMISES NO 112 STRAND LONDON

PROF. E.M. BARRY R.A.
ARCHITECT



SCALE OF FEET

10 5 0

ELEVATION

10 20 30

SECTION

MAURICE B. ADAMS DEL.

RESIDENTIAL BUILDINGS IN VICTORIA STREET.

ONE of the most important visits by the Architectural Association was made last Saturday afternoon to two blocks of residential flats in Victoria-street. One of these, called the "Alexandra Mansions," we have already illustrated in the BUILDING NEWS of January 10. We here, however, more particularly describe the block called the "Members' Buildings" as the most complete of the two. It occupies a wedge-shaped plot between Victoria-street and another street; the corner portion, however, at the junction, has been set apart for banking premises. We may observe that the architect, Mr. Francis Butler, has adopted what may be called the "staircase" in contradistinction to the "corridor" system of arrangement. There are two main entrances, and these lead to spacious halls common to the various sets of residences. Three staircases give access to the several sets or suites of apartments, and each of these have two landings; in fact, the principle of the system is to give each set of apartments its own landing, and thus obviate the frequently-urged objection of making one staircase serve as a communication to several sets of dwellings. The number of rooms to each residence varies; in some cases there are four and five rooms, and in others three and five, each suite having its own landing and entrance. Each set comprises an entrance and hall, tenants' and porters' lifts, a w.c., a sitting-room (in some cases double with folding-doors) and two or more bedrooms. The kitchen and stove occupy the basement, and the whole of the service is under the control of the manager. The smaller suites of rooms are let, we are informed, at £150 per annum, and the larger at £200, and these sums include attendance and taxes. The cooking may be contracted for between the tenant and the manager, and the system has all the advantages of the co-operative plan. The floors are fire-proof, and the sanitary arrangements are pronounced perfect. In the "Alexandra Mansions" four residences are obtained on each floor approached by two staircases. The principal rooms vary from 20 feet by 17 feet to 14 feet by 12 feet. In each residence there will be a hall, with lift and w.c., and a corridor approach to a principal room, sitting-room, bedroom, and dressing-rooms, besides kitchen, scullery, and offices. Light is derived from a central area.

Architecturally, the former design is marked by some ingenuity in the planning. The staircases in both buildings are made important features of the interior. The newels are of stone, the stairs of veined marble, and the entrances and landings are paved with encaustic tiles. The stone arcades in the lobbies and landings relieve the generally cold look of these approaches, and the form of arch and the details are in a domestic French-Gothic—a sort of Transition between Florid Gothic and Renaissance. The lighting of some of the passages and rooms appeared to us insufficient, though, to do the architect justice, he has shown some skill in the lighting areas in cutting off the angles of projections. In so cramped a site, and in a building of such a height, lighting was a matter of difficulty. The entrances to the members' buildings, with thin, flat, elliptical doorheads, having vine-and-oak foliage carved round the jambs, are made conspicuous features, together with the bays. The centre doorway leads by a wide corridor to an elongated octagon hall, with lantern over 20ft. by 15ft., placed obliquely to the axis, and from this hall access is obtained to two sets of residences in front, and to a corridor in the rear. On the right side is a suite of rooms with its own entrance hall, two front sitting-rooms, about 16ft. by 15ft., and two bedrooms. The bay projections add much to the spaciousness of the principal rooms; externally they form pronounced features, being carried up eight stories, including the ground floor, and two stories above the eaves level. A bold coved carved cornice marks this junction, while the chimney shafts assist to break the skyline. The termination of the bays is pleasingly managed and their pointed roofs also help to break the steep roof. There is a strong touch of French in these and other parts. The flat windows are also slightly projected, and form vertical features in the façade. Bands moulded and carved with panels of varying form and design, connect the parts horizontally, while between the ground and first stories a balcony, boldly corbelled out round the bays and richly charged

with carved panels, forms a conspicuous feature. The whole of the façades are executed in Tisbury stone ashlar, supplied by Mr. Alford, and present a very imposing appearance to the street. We may note that the windows are mullioned with transoms, the angles and heads being rounded at the corners. In the Alexandra Mansions, illustrated by us, a similar treatment of the façades is noticed, but these are still unfinished. We observe one improvement in the latter block—namely, the windows have balconettes. The corner also has an octagon bay or turret. It will be unnecessary here to describe the arrangement, the plans of which we have already given, but the same principle of planning has been followed out in the suites of rooms and *maisonnettes* on each floor.

INDIAN POTTERY.

MR. GEORGE BIRDWOOD, on Wednesday evening, read a paper at the rooms of the Society of Arts upon the subject of "Indian Pottery at the Paris Exhibition." He desired to draw popular attention to the interest awakened among the cognoscenti and curiosos of Paris in Indian pottery, and to the warning which he had elsewhere raised against the influences which were enfeebling and corrupting its artistic character, and which would only become aggravated by the commercial demand now sure to spring up for it, unless they were from the first intelligently resisted alike by its purchasers, importers, and manufacturers. After referring to pottery of English manufacture, he passed on to a description of the principal varieties of Indian pottery suitable for exportation, particularly mentioning the red earthenware pottery of Travancore and Hyderabad, the red glazed pottery of Dinapore, the black and silvered pottery of Azimghur and Surat, the painted pottery of Kotah, the gilt pottery of Amroha, the glazed and unglazed pierced pottery of Madura, and the glazed pottery of Scinde and the Punjab. In all these varieties of Indian fancy pottery an artistic effect was sought to be produced; but only the pottery made at Azimghur, and in Scinde and the Punjab, and the Bombay School of Art pottery, were exhibited at Paris, and it was only of these examples that he proposed to speak. In the best Indian pottery was also found the reverent subjection of colour and ornamentation to form, and it was in attaining to this result that the Indian potter has shown the true artistic feeling and skill of all Indian art manufacturers in his handiwork. The great secret of his mastery was the almost intuitive habit of the natives of India of representing natural objects in decoration in a strictly conventional manner; symmetrically and without shadows. In this way, the outline of the form ornamented was never broken. The decoration was kept in subordination to the form also by the monotonous repetition of the design applied to it, or by the simple alternation of two, or at the most three, designs. Also, never more than two or three colours were used, and, when three colours were used, as a rule, two of them were only lighter and darker tints of the same colour. The potters' art was of the highest antiquity in India, and the unglazed water vessels made in every Hindu village were still thrown from the wheel in the same antique forms represented on the ancient Buddhist sculptures and paintings. Some of this primitive pottery was identical in character with the vases found in the tombs of Etruria, dating from about B.C. 1000. The glazed pottery of Scinde was made principally at Hala, and that of the Punjab at Lahore, Mooltan, Jang, Delhi, and elsewhere. It was said that the invasion and conquest of China by Chingiz Khan, in 1212, was the event that made known to the rest of Asia and Europe the art of glazing earthenware; but, in fact, the Saracens from the first used glazed tiles for covering walls and roofs and pavements, and of course with a view to decorative effect. Mr. Birdwood, after describing the technical details of the manufacture of Indian pottery, and referring to the habits of the Hindoo villagers, in conclusion said that he had gone fully into the Indian patterns, surroundings, and antecedents because they could only proceed profitably in their inquiries by the chronological and historical reduction of the origin of art. It need not be enforced, he thought, how much an intelligent study of economical and historical influences under which the arts of India had been produced and were sustained, would help

to a fuller understanding of the origin and development of the Indo-European art generally. In the course of a brief discussion, in which Mr. Andrew Cassels, and Mr. Kipling (of the Government School of Art at Lahore), Mr. Doulton, and others, took part, it was stated that all articles of Indian manufacture had of late appeared to indicate a decadence of Indian art.

COMPETITIONS.

BRISTOL UNIVERSITY COLLEGE.—The Council of Bristol University College met last week to consider the plans sent in by eight architects for the new building, and they decided on appointing Mr. Charles Hansom, F.R.I.B.A., as their architect. On Thursday, Friday, and Saturday the plans were exhibited to the public. In addition to Mr. Hansom's design there were designs furnished by Messrs. Stuart Colman, J. H. Hirst, F.R.I.B.A., John C. Moncrieff, Lysaght and Scoones, E. H. Edwards, S. C. Frupp, and H. Crisp. Mr. Hansom's design is in the Tudor style. Mr. Stuart Colman sent in two pen-and-ink bird's-eye views. Mr. E. H. Edwards furnished a design for a two-story building, which would occupy about 80 feet in depth of the site and run parallel to the wall inclosing the property of the Blind Asylum, leaving an average depth of 96 feet, on which hereafter to erect the north wing and new front. An alternative design for a three-story building occupies a similar position to that proposed for the two-story structure though it is more compact in plan. The approximate estimates were between £8,000 and £9,000. A perspective in pen-and-ink, by Mr. John C. Moncrieff, was submitted, the style being Early Gothic. Mr. Henry Crisp's elevations were evidently considered as subservient to the plans, and treated simply as sketches, thus literally answering the request of the council in their instructions to architects. Mr. Frupp's design shows an elevation in the modern Italian style. The plan does not provide for any ornamental building to be erected hereafter in front of those now required, but it gives all the accommodation set forth by the council for the college and the chemical department with abundance of light and air, at an estimated cost of about £7,300. The estimates sent in by the different architects varied from about £8,000 to £18,000, Mr. Hansom's design costing about £15,000, which, judging from the accommodation at present required by the University, about 200,000 cubic feet, exclusive of passages, store-rooms, attics, foundations, &c., is not extravagant. His scheme, when completed, will cost between £25,000 and £30,000.

BUSHEY.—We have seen the five sets of design submitted in competition for the erection of a new church at Bushey, Herts, to cost £5,000, with tower, giving space for eight bells, and to accommodate 500 people. Mr. W. Young, of Exeter Hall, sends a pen-and-ink perspective, showing the tower above the choir, but excludes the cost thereof from his estimate. Messrs. Pillan and Page, of 18, Buckingham-street, submit a coloured perspective and interior, with tower over north porch; estimate, with tower, £6,500. Mr. R. Raikes sends a coloured perspective, showing tower and spire at north-west entrance. The chancel is apsidal, and the exterior treatment differs from that of the rest of the designs, which are of the usual type. The upper stages of tower and spire are not included in the estimate. Mr. W. H. Syme, of Watford, has a coloured drawing, and also a perspective in pen-and-ink. Tower is shown over south transept, and there is a strong resemblance generally to the Baptist chapel recently erected by the architect at Watford. Mr. Syme backs his estimate by a builder's tender guaranteeing the execution of the work for £5,200. Messrs. Coe and Robinson send two coloured perspectives, one showing the proposed church in red brick, and the other in Wolverton stone; tower and spire over north-western entrance. There is also a highly-coloured interior, the elaborate fittings shown in which are probably not meant to be included in the estimate. The design is the best of the five; Mr. Young's, in our opinion, coming next. Two of the other competitors find it necessary to find accommodation for part of the congregation in transepts, which are uncalled-for in a church of the kind proposed.

TAUNTON.—The proprietors of the North Town Nursery Estate, Taunton, recently invited plans for laying out their property as building sites, offering a premium of £50 for the best plan, and

£10 for the second. Over a hundred sets of plans were sent in by architects and surveyors in all parts of the country, from Burrow, Lowestoft, Falkirk, Dublin, and Edinburgh, &c. The owners were assisted in their adjudication by Mr. Davis, a local builder, and made the following awards:—1st premium, Messrs. Habershon and Fawcner, of Bloomsbury-square, London, W.C., and Newport, Mon.; and Messrs. Poole and Jones, Wandsworth-common, London, S.W.; placed next in order of merit, Messrs. Medland and Son, Gloucester, and Messrs. Erril and Clive, Chesham. Messrs. Habershon and Fawcner's plan has been adopted. It is conceived on purely utilitarian principles, the aim being to get as many houses as possible upon the given area, so as to produce diversity of class and amount of general rental; 135 plots of various sizes are shown.

BOOKS RECEIVED.

Brian Boru, a tragedy, by J. T. B. (London: Longmans, Green & Co.) is, as we have already announced, the work of a member of the architectural profession, whose name is well known to us and our readers, and some of whose buildings have been illustrated in our own pages. We have little space to spare for notices of purely literary works, but we feel sure that everyone who buys a copy of the book will be charmed with it. It is so simple and natural as to remind one frequently of the greatest of dramatists, one of whose well-known plays it somewhat resembles in plot and character, without, however, any suspicion of plagiarism. "J. T. B." will, unless we are much mistaken, be remembered as the author of "Brian Boru" long after the most substantial of his buildings has crumbled into ruins.—*The Patenters' Manual*, by James and J. H. Johnson (London: Longmans & Co.), is the fourth edition of a guide which has stood many an inventor in good stead, and will prove invaluable to many more.—*Luxton's Price Book for 1879* (London: Kelly & Co.) appears for the sixty-second time, and, as usual, leaves little to be said about it, except in commendation of the care exercised in its revision and preparation.—*Spon's Architects', Builders', and Contractors' Pocket Book* (London: E. & F. N. Spon) is another work of a similar kind, and equally excellent.—*Our Domestic Poisons*, by Henry Carr, M.I.C.E. (London: W. Ridgway), is a noteworthy account of the poisonous effects of certain dyes and colours used in domestic fabrics.—*The Fight with Infection*, by W. Stephenson, M.D., F.R.C.S.E. (Aberdeen: D. Wylie & Son), is a cheap and handy treatise, giving much valuable information respecting infectious diseases, which all should possess, which many have felt the want of when required, and which medical men have not always the ability or time to impart.—*Useful Information on Practical Electric Lighting*, by Killingworth Hedges, C.E. (London: E. & F. N. Spon), may probably be of service to people unacquainted with the subject, but contains little likely to be new to electricians.—*The Steam-Engine of the Future*, by John Bourne, C.E. (London: John Bourne & Co., 66, Mark-lane, E.C.), is a shilling treatise which should be read by every steam user in the kingdom. There are but few of them, we imagine, to whom the name of its veteran author is unknown.—*The Ornamental Penman's Alphabet* (London: E. & F. N. Spon) may be useful to engravers, stonecutters, and others, although there is nothing very new or ornamental about the few styles of letters not to be found in all other copy-books of a similar kind.—*Fuel: its Combustion and Economy*, edited by D. Kinnear Clark, C.E. (London: Lockwood and Co.), is a new edition of one of the well-known volumes of "Weale's Series." The very large amount of new matter added really renders the book practically a new one, and few engineers are better qualified as exponents of the results of recent progress in the economy of fuel than the gentleman to whom the work has been entrusted.

PARLIAMENTARY NOTES:

BACK-TO-BACK HOUSES.—Sir S. Waterlow last week asked the President of the Local Government Board whether that Board had, after communicating with the local authorities, conceded the principle of erecting back-to-back houses; and, whether he would object to lay upon the table of the House a report upon the subject prepared by Mr. Netten Radcliffe, of the Medical Department of the Board, and Mr. P. Gordon Smith, the Board's architect,

after local inquiry in the districts where the concession of the principle was granted. Mr. Selater-Booth—It would not be correct to say that the principle of erecting back-to-back houses has been conceded by the Local Government Board, but it is true that in the case of Idle in the North Brierly Union the Board have stated that, owing to the exceptional circumstances of the locality, they considered that this form of construction might be recognised, provided certain conditions could be complied with, and the regulation brought within the operation of by-laws under the Public Health Act. But no by-laws have as yet been submitted by the local authority, so that none have as yet been sanctioned by the Board. I should mention that one of the peculiar circumstances is that Parliament has sanctioned back-to-back houses in the neighbouring towns of Leeds and Bradford. There is no objection to lay upon the table of the House the reports of Mr. Netten Radcliffe and Mr. Gordon Smith on this case.

METROPOLITAN FIRE BRIGADE.—In answer to Mr. Ritchie, Mr. Cross said he was unable to say whether the Government would be able to introduce this session a measure dealing with the subjects reported on by the Select Committee on the Metropolitan Fire Brigade. It was, no doubt, a very important subject, and one to which the attention of the Government had been called by a recent occurrence.

WATER SUPPLY OF LANCASHIRE AND YORKSHIRE.—On Tuesday, Mr. S. Howard, seconded by Mr. Wheelhouse, moved for a Royal Commission to inquire into the deficiencies of the water supply of Lancashire and Yorkshire, and into the necessity and expediency of resorting to the lakes of Cumberland and Westmoreland. In support of it he canvassed the evidence given before Committee on the Thirlmere scheme last year, contending that it had not adequately considered the question from the public point of view. Mr. Selater-Booth was of opinion that the grounds assigned by Mr. Howard were entirely insufficient to justify the appointment of a Royal Commission, and pointed out that there already existed ample information on the subject in various Blue-books. Mr. W. E. Forster and Mr. Raikes advised the withdrawal of the motion; and Dr. Playfair, the Chairman of last year's Committee, vindicated the completeness of its inquiry. The motion was then withdrawn.

Building Intelligence.

INCORPORATED CHURCH BUILDING SOCIETY.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting last week, at 7, Whitehall. The following grants were voted from the general fund, viz.:—Towards building a new church at Jump, in the Parish of Wombwell, near Barnsley, York, £150; building the new church of St. Paul, Lozells, in the parish of St. Silas, Birmingham, £200; rebuilding (on a new site) the church at Duddo, near Norham-on-Tweed, £80; and towards enlarging or otherwise improving the accommodation in the churches at Ashby-de-la-Zouch, £100; Backford, near Chester, £25; Black Notley, near Braintree, Essex, £25; Chastleton, near Moreton-in-Marsh, £15; Norwich, St. Augustine, £25; and Stanway, near Colchester, £50. Under urgent circumstances, the grant formerly made towards building the church of St. Lawrence, Morecombe, was increased from £300 to £350. Grants were also made from the Mission Buildings Fund towards building mission churches at Lead-street, in the parish of St. Matthew's, Leicester, £75; and Sturton, in the parish of Stow, near Lincoln, £50.

SOUTH SHIELDS.—The new Corporation stables at South Shields were opened last week. The stables are 90 feet by 30 feet, and have standing room for twenty-six horses, and two large boxes. Howorth's patent revolving foul air extractors have been used. The buildings were designed by Mr. Matthew Hall, Borough Surveyor, assisted by Mr. R. Greaves, and Mr. C. Cobham has discharged the duties of clerk of the works. The contract has been carried out by Messrs. D. Kennedy and Son, of Jarrow, at £4,000.

The renovation of Tuckingsmill church has now been completed. The chancel has been thoroughly restored by Mr. May, of Pool, from designs by Mr. J. P. St. Aubyn, and the cost has been about £320.

The Risca and Mynyddislwyn School Board have approved of plans prepared by Mr. Watkins, architect, of Newport, Mon., for a new school for 300 children to be built at Crosskeys.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the **EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.** Cheques and Post-office Orders to be made payable to **J. PASSMORE EDWARDS.**

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—B. and Co.—C. and H.—T.H.R.—E. and Co. T. S. Co.—W. and J. F.—McN. R. and Co.—B. B. Co.—F. W. B.—D. and H.—W. L. B.—B of S.—S. E. Co.—H. L. B.—G. and C.

L. W. (In reply to your queries as to hollow walls: (1) the quoins and dressings should not run through, but a cavity preserved all round. This is one reason why we prefer the greater thickness to be on the outside. If the stones pass the cavity, the damp is sure to permeate. (2) Most certainly the cavity should be carried round the chimney. The method you show in sketch is quite wrong, though many architects, in ignorance of the effects, adopt it.)—T. H. MENEITH. (All openings are deducted, except flues. If the rule you understood were adopted, most windows would be measured as solid. Order Treatise on Measuring published by Crosby Lockwood and Co.)

OUR COMMONPLACE COLUMN.—Notes or quotations upon the subjects of Glass Painting, Glazing, Gopura, Gothic, Granary, Orange, Granite, Greenhouse, Groin, Grotesque, Grouting, Gymnasium, &c., will be received on or before March 12th.

YOUNGSTER (Send to B. T. Batsford, 52, High Holborn, W.C., for a catalogue).

"BUILDING NEWS" DESIGNING CLUB.

As the following were unintentionally omitted in our review last week, we now mention them:—**OOMORE.**—(Pulpit weak in design: the base is squat, and the details lack knowledge. The figure in central panel would have been better omitted. We intended to place this design with others at end of article.)—**CHE SARA SARA.** (The last remark applies to this. The faults of the design are: the weak angle shafts: the shaft supporting book-rests and the mouldings have too many quirks.)—**RUSTICS.** (The defects of plan are the doors opening into living rooms, ill-lighted stairs, and no washhouse. Elevations are better. The design we intended to place in the last group.)—**RESEDA.** (We see your object.)

Correspondence.

PICTURESQUE ARCHITECTURE.

To the Editor of the BUILDING NEWS.

SIR,—I was pleased to see the letter in your issue of the 7th inst., from "An Architectural Fogey," and I heartily wish that the subject he touches upon could be ventilated thoroughly, with the effect of clearing and purifying the architectural atmosphere.

Of course, the idea of criticising any work of a master like Mr. Shaw may seem bold to many of us; but if an acknowledged clever designer, as Mr. Shaw undoubtedly is, is being so far led by, or is leading, the strange mania for it can

hardly be called by any other name) of the present time, so much the more reason for some one to protest, seeing the immense harm that will be done; for, of course, such a man always has shoals of smaller fry anxious to follow in his wake.

In the name of common-sense some one must protest against the vagaries of those whose sole endeavour seems to be to produce picturesqueness and quaintness at the expense of all true architectural feeling and consistency.

Though architecture is not to be expressed by the following of a set of arbitrary rules, yet laws of some sort must govern all true art; how the Church of St. Michael, on the Belford Estate, breaks through all rules, and only aims at picturesqueness, is so well put by your correspondent, that I need say nothing on that particular design. My object in writing is to raise another protest against the wave of "fashion" (most sad that even architecture should be the slave of fashion), which seems almost irresistible, but is likely to render the architect who falls under its sway, and proves it by his executed works, ridiculous to all but his mere contemporaries who are infected by the same mania.

We do not seem in a state of honest transition or development, but as a drowning man catches at a straw, so we are continually catching at some phase of art (?), and we copy Japanese, Queen Anne, Jacobean, &c., &c., in turn, anything, in fact, by the copying of which we can hope to produce something picturesque or quaint in feeling, either in building or decorating. Truly, there is no lack of "art" among us, but it is the art of copying.

THE BUILDING NEWS has always advocated truthfulness and fitness, as well as utility and beauty in architecture, and I hope that now, when such men as Mr. Shaw seem to be throwing aside all "old-fashioned" ideas of this sort in their determined (and, it must be confessed, often clever) efforts after mere picturesqueness, you will raise your powerful voice on the side of truth and consistency.—I am, &c.,

TRUTH IN ART.

MATLOCK CHAPEL COMPETITION.

SIR,—Your readers will, of course, see that the letter in your last paper from "Dixon and Moxon" in no way deals with the question. Let these gentlemen make no mistake. I congratulate them heartily on their good fortune in having such friends on the Committee; it matters not to them whether these friends are of sound principles or otherwise. But I do emphatically protest against being invited to compete, when all the time careful arrangements are being made which render the thing a farce, if not something worse. Nobody would have objected to the above gentlemen being appointed straight off.

"Dixon and Moxon" are right in one particular. The Committee are entire strangers to me, so, in case of success, I certainly should have considered that fairness, or at least impartiality, had been exercised.

I will not say more as to the superior unsuccessful designs, except that, as everybody knows, it is no difficult matter in a very short time to pick out a number of good designs from a large collection, but it would probably take much time to select one as the best.—I am, &c.,

"ONE OF THE UNSUCCESSFUL 83."

ARTISTIC BLOWERS TO OPEN FIRE-PLACES.

SIR,—The letter of "An Old Tee Square" on this subject reminds me that about six years ago we did the self and same thing he approves as "Mr. Burges' practical idea," with the exception of omitting the iron bar, which makes an unsightly line across the fire opening.

I found that if the plate-glass was properly bedded at the ends *loosely* it did not crack, and we also ground the bottom edge, which is an improvement.

One fire with a large square opening, all tile-jams and square dog-grate, puffed back smoke considerably; so we made a piece of plate-glass dip in the centre, like the old-fashioned buck-board of ladies' schools, grinding the bottom edge as before, and it was cured.—I am, &c.,

Fe. 24, 1878.

EDWARD STARR.

THE R.S.A. EXHIBITION.

SIR,—Brief criticism must needs be defective, but for any inaccuracy in the description of his design, Mr. Aitken is himself to blame. Had he read with understanding, he might have seen that the expression "inevitable tower and spire" was used generically, as descriptive of a number of designs besides his own; domical and pyramidal spires included. The expression was employed to note the singular fact, much more important than any detail of his design, that every church of any size, nowadays, is not considered presentable without a tower and spire. "Tower" and "spire" were used conjunctively to note another singular fact, that no tower, pure and simple, is enough, but it must have some superstructure, which cannot well be otherwise described than as a spire. Even in this Exhibition there are at least three varieties of the stunted spire. Mr. Aitken's was included, because it is not only an attenuated dome, but it has a turret on the top of it, and has thus a much greater affinity with the popular notion of a spire than with the idea of a dome; and in the general landscape of Dundee, distance, with its enchanter's wand, will unquestionably transform its rather ungainly curvature into the appearance of one of the numberless varieties of stunted spires.

The mistake as to the interior arrangement of the design was unavoidable, as there was no plan, and the description given very naturally credited the interior with the natural, economical, and artistic divisions indicated by the drawing. The perspective shows a nave and transept roof, also a nave and transept gable.

R. S. ACADEMY.

R.S.A. EXHIBITION.

SIR,—In your review of the architectural drawings, reference is made to the "exaggerated" scale of the design for New Church, Portobello. The drawing shows, by a joint in the paper on the face of it, that its size must have been an afterthought, consequent on the addition of a spire, drawn on an overlapping slip down the centre of the original.

The review, in another part, refers to a drawing being "preposterously large for its importance," and "placed close to the spectator." Yet there is a printed notice on the walls of this exhibition to the effect that its accommodation is limited.

Is it not possible that the hanging committee considered that there was something in the drawings which not only neutralised the effect of their size and scale, but entitle them to their position?

Another generalisation in the review calls for this comment: that in arranging the pictures on the walls of an exhibition it is usually supposed that the smaller and inferior pictures are used for "packing," not the larger.—I am, &c.,

JAMES FAIRLEY, A.R.I.B.A.

ARMY AND NAVY CLUB-HOUSE.

SIR,—In your notice of the reopening of the above in last week's BUILDING NEWS, you state that the "general repairs and renewal of furniture were entrusted to Messrs. Holland and Son." This, so far as the furniture is concerned, is perfectly true; but as the whole of the very extensive structural alterations and general repairs, as well as the entire decoration of the club, was carried out by us, under direction of H. R. Gough, Esq., the architect, we trust you will allow us to make this statement. As the decorations, in particular, have been very highly spoken of, we think it only fair that we should have our share of the credit.—We are, &c.,

THOS. WONTNER SMITH & SON.

79, Essex-road, Islington, N., 26 February, 1879.

"GAS IN THE HOUSE."

SIR,—I find your issue of Feb. 21 affords a full and fair criticism of my pamphlet under above title. Will you, however, permit me to point out two small errors affecting the sense of suggestions I have made:—In place of saying "no gas-pipe under 5ft. should be of less bore than $\frac{1}{2}$ in." I proposed that, "except for short distances (under 5ft.) no gas-pipe should be less than $\frac{1}{2}$ in. bore." Again, I have not advocated "gas-pipes and stoves" for bedroom use. It was to the merit of "gas fires" I desired to draw attention.—I am, &c.,

H. FARADAY.

3, Berners-street, London, W., Feb. 25, 1879.

CHURCH BELLS.

SIR,—In the current issue the Rev. R. S. Philpott inquires at what period church bells were first hung to wheels, and raised and rung in peals?

I have the authority of the Rev. H. T. Ellacombe, of St. George's Clist, the venerable and well-known authority upon campanology, for saying that in the very earliest fabric rolls and churchwardens' accounts items are charged for under the description of *bell-wheels*. But a whole wheel was not used before 1600. On the Continent they are seldom applied.—I am, &c.,

Exeter, Feb. 25, 1879.

HARRY HEMS.

Intercommunication.

QUESTIONS.

[5694].—**A Young Architect's Library.**—Will any correspondent compile a list of works showing how a young architect may, for a moderate sum—say, £50—get together such a nucleus for a library as shall not leave him without information on any practical subject he may have occasion to refer to in the course of his practice? Such a library should contain—1st, Geometry, drawing, and surveying; 2nd, Construction, with well illustrated details of the ordinary arrangements in all trades; 3rd, the principles and practice of ornament; 4th, scholarly works with details on the various styles.—THULE.

[5695].—**Measuring Plaster Work.**—In measuring up plasterers' work, are the openings of doors and windows deducted, and if so, would small windows be deducted such as 3ft. by 3ft. = 1 yard super? Are walls to be measured from floor to ceiling, or top of skirting-ground to under cornice?—A PIERCEWORK PLASTERER.

[5696].—**Brick Wall.**—Can any of your readers advise me how to construct a brick wall 16in. in thickness, having a cavity of 12in. in breadth? The bricks being 9in. long, I wish to know how the two portions of the wall, one 9in. thick and the other 4in., ought to be tied together.—C. C. C.

[5697].—**Weight of Wrought Iron Girders.**—In the articles on Quantities (Smith and Founder, 1st Vol., 1873) is an example for calculating weight of wrought girders, with dimensions, and states the same at 12cwt. 1qr. 25lb., but to be worked out by the reader. Independent of the rivets I make the weight 16cwt. 3qr. 4lb. The item for rivets I do not quite understand—viz., the 6, but which I think into the number of rivets 60. Will Mr. B. Fletcher kindly explain? I notice also queries by Wm. W., on p. 744, which I think remain unanswered.—LEARNER.

[5698].—**Royal Engineers.**—Will some kind reader give me a little information about the office of the Royal Engineers? I mean the office in which such drawings and works as Mayo College, illustrated in the BUILDING NEWS last week, are executed? How do you enter the office? Is it by competition? Is there any limit to age? And what knowledge do you require most, engineering or architecture?—D. M.

REPLIES.

[5649].—**Country Publichouses.**—"J. W. W." is no doubt in search of the picturesque in roadside publichouses. We know of no work upon the subject, and the old coaching scenes invariably picture imaginary inns. The half-timbered houses are far older than the coaching days, and the inns on the great roads contemporary with those days are of the plainest order. Here and there in the old towns of the Midlands, inns or publichouses are still to be seen of half-timber construction, and some of them possess a little architectural character. Taking Nottingham as a centre, the following may be noted in the town:—"The Postern Gate" where there is a remarkably fine wood ceiling; the "Cross Keys," in Brayard-lane, is a good type of an old tavern; the "King John's Palace," Widemouth-gate, a very quaint building, especially in the rear. Until late years, this town possessed an inn on the Long-row, called the "Old Bear." It was two stories high, with an attic in the roof, which consisted of sundry gables towards the front; and the ground-floor front was set back some nine or ten feet, and the superstructure was supported on wooden columns, a piazza being thus formed underneath. There are a few business shops on the Long-row of Elizabethan type that are very suggestive of ancient inns. In Grantham there are several half-timbered taverns of ordinary character, and there may be seen the celebrated inn the "Old Angel," which, by the bye, is of stone. Adjoining this inn is a fine half-timbered building, the first floor of which has a wooden balcony stretching across its front, a balcony that is protected by the overhanging story above. In Newark there are two old inns, the "Queen's Head," and the "White Hart." The former stands at the north-west corner of the Market-place, and the latter at the south-east, this is very ancient. We make this note as we are not quite certain of the names or signs of these inns. There are several blocks of old property in this town that are very picturesque and very suggestive of ancient taverns. In Mansfield there is the "White Hart Inn" in the Market-place; but modern improvements have stamped out its old character, save in the back elevation of the part over the gateway, where the original windows are left. In this part the original winding staircase exists, constructed of solid blocks of oak. In Worksop may be seen the "Ship Inn," a real old gem. Nothing is known of this house in the way of history, but its name suggests that it was so called in honour of Admiral Drake and his victories. This house is engraved in White's "Sheerwood Forest and the Ostleries," where it is said to have been in some part modernised. In Sheffield there are no old inns or taverns of this character, but there is an old building in the neighbourhood of the Midland station, adjoining the entrance of Mr. Longley's timber yard, a building formerly a lodge or farm on the estate of the Dukes of Norfolk. It is highly ornate, and is rich in architectural character; of late years it has sunk to the rank of cottage property, and it is hidden in part by neighbouring houses; nevertheless, there is sufficient material to enable its restoration to be easily made on paper. There is also some old property on "Sniig-hill" in this town that affords a little character in the upper stories. Outside the radius imposed by J. W. W., there is a remarkable building in Kirk-gate, Wakefield, called "Six Chimney House," and some very quaint old houses on the south side of Westgate, which, of late years, have been partly built up in front, and the overhanging character of the upper stories destroyed. The oldest half-timbered inns the writer is acquainted with are the "King's Head," a house suggestive of "Bluff Hal," in High-street, Hull; it is a house noted by old Taylor, the water poet. In the same street another old building exists, with a gateway in the centre; this is known as the "entrance to George-yard," and is said to have formerly been an inn. To anyone interested in the study of old property, the finest field to visit is the City of York, where

a month may be well spent by any artist. The most picturesque spots are the old shambles, the yards leading from the pavements, and in the old college buildings and their precincts.—W. S.

[5632.]—**Casts of Carving.**—"T. B.'s" remark that I am incorrect in saying pipe-clay is procured near Chudleigh, and his correction that it is found in the neighbourhood of Newton Abbot, is a trifle censorious. A glance at the map of Devon shows at once that Chudleigh and Newton Abbot are two little towns in the southern part of that county, some five miles away from each other, whilst the parish of King's Teigniton, the district where the major part of the clay is procured, lies somewhat to the east between the two. Hence my assertion and "T. B.'s" correction amounts to precisely the same thing. Besides pipe-clay, a deal of fine pottery's clay is also procured at King's Teigniton, and some two hundred men are kept constantly employed in the pits. They raise and send out on an average 50,000 tons per annum. The clay lies in beds varying from 20 to 80 feet deep. Pipe-clay is supposed to be decomposed granite, deposited by the hand of nature in the valleys where it is found. The clay varies in quality, and that should be selected for modelling purposes which is the most free from grit, and able to take a good polish, besides being tough and plastic in a damp state, though not too brittle when dry. The principal clay-workers at King's Teigniton are Messrs. Watts, Blake, Bearne and Co., who have business offices at Newton Abbot, Cornwood, and St. Austel. Messrs. Whiteway and Co. are also large clay merchants, and there are one or two minor firms besides, but the company I have first named do by far the largest business. It is Messrs. Watts, Blake, Bearne and Co.'s clay that is principally used at the various schools of art in this and other countries, and their pipe-clay is sent continually to every part of the civilised world. The cost of the clay wholesale is a guinea a ton, a tally of 70 "balls" going to the ton. Carriage to London is 5s. a ton by water (per Teignmouth), or about £1 for that weight by rail. Of course, when in a retail way the student pays a shilling for "a ball," he pays at the rate of £3 10s. a ton, so that to those who model a deal, and to all other large consumers, a considerable saving is effected by providing the clay direct from Devonshire. King's Teigniton is a village numbering 1,000 souls.—HARRY HEMS.

[5674.]—**Ordnance Datum.**—Thanks to "A. L." I should have done as he mentions, if the Ordnance Maps of my neighbourhood were published on the 6-inch scale, but there are none available at present. The one-inch scale maps do not give the heights of the bench-marks. There is an Ordnance work published "On the principal lines of Spirit-levelling in England," or some such title. Can anyone inform me if it gives the data I require?—BETA.

[5685.]—**Water-colour Drawings.**—My reply last week, under the head "Body Colour," will, I think, meet partly the query of "Y. Z." Mr. Ruskin is an admirable critic upon many things, but his recommendation as to body colour must be taken with reserve. I should certainly recommend "Y. Z." to follow the practice of "transparent colouring" in water-colours, as one less open to the trickeries of the art, and, moreover, the most natural way of laying on colour in this vehicle. Why should you mix, for instance, white with brown, to produce a lighter tint, if the same effect can be obtained by a simple wash of brown? If mere thickness of colour is the object, surely the process is not legitimate water-colour. But I may refer to some of our leading artists of the water-colour school, to show that the practice is avoided.—G. H. G.

[5686.]—**Bells.**—The method of calculating the number of changes on various bells is by multiplying the last remainder by the next number of bells. Thus, for two bells two changes, for 3, multiply 3 × 2, making 6 changes, for four bells 6 × 4 = 24 changes, for 5 bells, 24 × 5 = 120, and for 6 bells, 120 × 6 = 720 changes, and so on, up to any number.—D. H.

[5686.]—**Bells.**—The way in which to calculate the number of changes that can be rung on various peals is by beginning at number one bell, and multiplying by each successive number, continuing to do so until you get to the required number of bells, and the result will be the answer. Thus, the number of changes that can be rung on 4 bells is the following: 1 × 2 × 3 × 4 = 24 changes; on 5 bells, 1 × 2 × 3 × 4 × 5 = 120 changes; on 6 bells, 1 × 2 × 3 × 4 × 5 × 6 = 720 changes and so on.—M. JOHNSON.

[5686.]—**Bells.**—I should advise you to procure Benson's or Kort's book on change ringing. Benson's is the best; it will cost about a half-crown. That will show the best method for calculating the number of changes that can be rung on different peals; but four bells is scarcely enough to ring changes on: there should never be less than five or six.—W. S. TUPPITT, St. Columb Major.

[5686.]—**Bells.**—The number of changes that can be rung on various bells is found by multiplying the number of bells together, so taking the number of bells as per question, 4, we have 1 × 2 × 3 × 4 = 24 changes. The number of changes that can be rung with a number of bells less than the whole peal, is found by taking that number from the highest number downwards. Thus, required the number of changes that can be rung with 4 bells out of 8, 8 × 7 × 6 × 5 = 1680 changes.—H. VICTOR.

[5686.]—**Bells.**—The changes that can be rung on 4 bells are 24. Ex 1 × 2 × 3 × 4 = 24. Then 24 × 5 × 6 = 720. Then 720 × 7 × 8 = 40,320.—G. B.

[5690.]—**Gutters.**—I should have thought no one had any doubt respecting the superiority of iron over wood gutters. As regards suitability, perhaps the old wood lead-lined gutter is most in character with the Queen Anne style of building; it has also a substantial appearance, and can be modelled at a less cost than one of equal size in iron. As regards cost, iron, properly painted, is cheaper than wood because more durable. The special advantages of iron gutters are unquestionable: (1) it can be modelled to suit any requirement; (2) its channel is better shaped for water conveyance.—G. H. G.

[5692.]—**Girders.**—In reply to "Student" the simplest and best way to consider the calculation of timber girders will be, perhaps, to work from the strength of the material as known. A piece of red pine of in. square and 1ft. between supports is usually considered to break with about 4cwt. placed on its centre between supports,

and the following three rules or laws of strength always apply, and can easily be proved (if not of themselves obvious without) as being based on elementary mechanical laws. Law 1st. The strength varies directly as the breadth. Law 2nd. The strength varies inversely as the length. Law 3rd. The strength varies as the square of the depth. Now follows the question with respect to the factor of safety or constant, as it is sometimes called, when adapted to a particular material under some special conditions. One fourth of the estimated breaking strength is considered to be sufficient for safety under a fixed load, and one-sixth, one-seventh, or one-eighth as a factor of safety for a moving load, according to possible velocity. Let us consider the load mentioned by "Student," as the fixed load—viz., 20ft., bearing 14in. depth and 8ft. apart, and weight 1½cwt. per foot superficial of floor space. We have then 20 × 8 × 1½ = 240cwt., but half will, when equally distributed, be carried by the supports, which give $\frac{240}{2} =$

140cwt. bearing on the centre of the girder. Let us obtain the factor of safety by considering that the piece of red pine, 1in. × 1in. and 1ft. long, will support a safe load of 1wt. placed on its centre between bearings, then (if lateral twisting be prevented) a piece 1in. wide, 14in. deep, and 1ft. long, will support a safe load of 190cwt. and a piece 1in. wide and 14in. deep, and 20ft. long, will support a safe load of 196 ÷ 20 = 9.8cwt. We have 140cwt. to support, ∴ 140 ÷ 9.8 = 14.28in. wide. If I had adopted the factor of safety—viz., 7, quoted by "Student," the breadth would then have become 24.99—say, 25in., and in such case if instead of considering the load to be equally distributed and fixed we were to consider it to be on the centre and moving, the 25in. would then become 50in. being then nearly the same as the result by Tredgold's formula, and which frequently might be required in engineering works, and when it would become necessary to have them perhaps 1-3rd of that breadth and 2ft. 8in. apart, centre to centre. The preceding will, perhaps, render apparent the following formula, and which is consequent on the preceding laws and method adopted.

$W = \frac{c \cdot b^2 \cdot d^3}{l}$ where W = the safe load—(viz., the breaking weight of the material, divided by the factor of safety, which in our case was 4), b = breadth in inches, d = depth in inches, l = length in feet.—HENRY ARMROSE.

[5692.]—**Girders.**—"Student" has worked the rule on p. 65 of Tredgold correctly, except that he has taken W to represent a central load instead of a distributed one, which would reduce the breadth in the ratio of 5 to 8, or $\frac{5}{8}$ of 50.285 = 31.428 inches. This would be the breadth required for a girder 20 feet long by 14 inches deep, to support a distributed dead load of 31,360 lb. without deflecting more than 1-40th of an inch per foot. It is not, however, the proper rule for the girders of a framed floor, which are stiffened by the other timbers of the floor. "Student" will find the rule he requires on p. 126, art. 197 of Tredgold, edition of 1875, and also a table worked out by the rule on p. 457. Tredgold's rules for floor girders are calculated to sustain only about 1 cwt. per foot super, exclusive of the weight of the floor itself. If "Student's" load is 1½ cwt., including the floor, he must increase the breadth given by the rule on p. 126, in proportion to the increased load. "Student" should study the articles on floors, in Tredgold, p. 121 to 144. As to the transposition of the formula in Hurst's Handbook, its simplest form is $b = \frac{W \cdot L}{C \cdot d^2}$

If a factor for safety of 7 be taken for a live load, and allowance made for inferior timber, "Student's" example will work out to about 33 inches for the breadth, which is not too much to sustain a moving load of 14 tons, when the beam is not stiffened, as in a framed floor. It is evident from the results obtained above that for so long a span, and so great a load, as in the example given by "Student," an iron girder would be the most suitable.—J. S.

[5693.]—**Turned Newels.**—Turned newels are quite in keeping with "Queen Anne" work, but they should be massive. Hand-wrought newels are more pleasing. Of course, the top and bottom of newel should be square, or those portions against which the handrail and string stop. (See BUILDING NEWS "Joinery Details," lately given.)—G. H. G.

STAINED GLASS.

MANNINGHAM.—A stained-glass window has just been placed in the chapel of the Tradesmen's Home, Manningham, as a memorial to the late Henry Brown, J.P., of Bradford. It is the last of a series of thirteen executed by Messrs. Camm Brothers, of Birmingham. Mr. Brown was a liberal donor to the institution, and was its first chairman; his widow also built at her own expense the newly-erected almshouses. The window contains six subjects from Matt. xxv., and is illustrative of the acts of mercy; the two centre subjects are larger than the others, and executed in rich although well-toned colours; the upper and lower lights are treated in grisaille and gold, with a richly coloured and highly ornamented border.

MEMORIAL TO DEAN MANSEL AT ST. PAUL'S.—A stained-glass window has been erected in the north-west chapel of St. Paul's Cathedral, nearly under the west tower, to the memory of the late Dean Mansel, and it was uncovered on the Feast of the Conversion of St. Paul. The subject chosen for illustration is the "Incredulity of St. Thomas," as related in St. John xx. 24; and the work has been carried out by Messrs. John Hardman and Co., of Birmingham and King William-street, Charing-cross, under the direction of Mr. Penrose, architect to the dean and chapter.

ST. NEOT'S, HUNTS.—Two stained-glass windows have just been placed in the parish church of St. Neot's, at the expense of Mr. C. P. Rowley.

That in the north aisle represents the Healing of the Infirm Man at the Pool of Bethesda, John v., 2—9. In the centre lights are the figures of Jesus and the man who had the infirmity 38 years. The window in the south aisle is the subject of the Woman of Samaria, John iv., 5—28. The windows have been carried out in the richest style of the 15th century. They were exhibited in the Paris Exhibition by the executors, Messrs. John Hardman and Co., of Birmingham.

WATER SUPPLY AND SANITARY MATTERS.

BEDDINGTON SEWAGE FARM, CROYDON.—The Local Board of Croydon have decided to call in Mr. Bailey Denton, to advise them generally on the sewage arrangements of this farm, as well as on the advisability of deep draining the land, and the establishment of filter beds for downward filtration, so as to relieve the farm, and to make it more profitable.

DRONFIELD.—The works for supplying with water Dronfield and the other towns and villages in the northern division of the Chesterfield rural sanitary area are being carried out by Mr. Stevenson, of Eckington, the contractor, under the supervision of the engineer of the scheme, Mr. Frith, C.E. The site of the reservoirs is on the moors a short distance from Owlbar; they will be supplied from the Barr Brook. The estimated cost of works was £25,000, but it is expected that, owing to the reduced prices of iron and labour, the actual sum expended will be considerably less. The Rural Authority propose to give the inhabitants a constant supply of not less than 12 gallons per head per day, and that the cost will be less than 2d. per household per week.

HARWICH.—A Local Government Board inquiry was held at the Town Hall, Harwich, on Tuesday week, before Col. Cox, in reference to an application by the Corporation for sanction to borrow the sums of £10,000 for sewerage purposes, and £1,200 for the purchase of a site at Dovercourt for a small-pox hospital. The plans submitted under the sewerage scheme were those of Messrs. Ross and Mimms, of Westminster. They provide that the whole of the sewage shall be discharged into the sea at the breakwater from a pumping station on War Office land by means of a high and a low level sewer—the latter being Harwich, and the former Lower Dovercourt. The worst gradient was one of 1 in 892 for a short distance. The inspector said the board were committed to the opinion that it was necessary to proceed with the sewerage.

WATER FROM THE LOWER GREENSAND.—The lower greensand at Caterham has just been reached at the depth of 851ft. from the surface, and a supply of pure water is now flowing from it, and will shortly be used in the district supplied by the Caterham Spring Water Company. The boring operations were commenced on the 29th of July last with a boring of 18in. diameter, and the lower greensand was reached this week with a diameter of 15in., solid cores of the strata passed through having been obtained. Other borings are being put down by the New River Company at Turnford and Ware to prove the lower green sand at those places, while the Lambeth Water Company is putting down a borehole at Ditton to test the depth of the chalk basin at that place. The boring at Caterham has been carried out by the Diamond Rock Boring Company, who successfully reached the lower greensand at Meux's Brewery, Tottenham-court-road, in 1877.

The Local Government Board have informed the Lambeth guardians that they consider that the erection of an infirmary would be sufficient alteration at the industrial pauper schools at Norwood. The guardians have instructed their clerk to communicate with Messrs. Coe and Robinson, who were successful in the recent competition for reconstruction plans, and to draw their attention to the difference between their estimate of cost and that of the Local Government Board.

All Saints parish church, Hopton-by-Thetford, Suffolk, in the diocese of Ely, is about to be restored from the designs of Messrs. Satchell and Edwards, of London. For the execution of the work the tender of Mr. Brooke has been accepted. The restoration of St. Margaret's parish church, Wattisfield, in the same county and diocese, has also been intrusted to the care of Messrs. Satchell and Edwards.

A report by Mr. Douglas, A.K.C., respecting the progress of the new Eddystone Lighthouse, of which he has charge, states that since the works were commenced last July the weather had permitted only 135 hours to be worked on the rock although every opportunity had been taken advantage of. It is not expected that the work will be above high-water level until January, 1880.

Our Office Table.

A PAPER dome has recently been made, according to plans by Prof. Greene, of Troy, N.Y., for an astronomical observatory which has been erected for the Rensselaer Polytechnic Institute. It is a hemisphere 29ft. in outside diameter. The framework consists primarily of a circular sill, which forms the base, and two semicircular arch girders (parallel) spanning the dome. These are of seasoned pine. The paper covering is made in sixteen equal sections, their bases on the sill and their extremities meeting at the top; the framework of each consists of three vertical ribs of pine meeting at the apex. The paper is about one-sixth of an inch thick, and is as compact in structure as the hardest wood. A 4ft. opening between the arch girder is covered by a shutter (also of paper, on a wooden frame). The weight of the dome and its appurtenances is about 4,000lb. It is supported on six 8-in. balls rolling between grooved iron trucks. No machinery is used to move it.

THE Markets Committee of the Court of Common Council have drawn up a report recommending the construction of a new fruit, vegetable, and flower market for the City, at a cost not exceeding £30,000. The City Architect has prepared plans and a model, estimating the cost at £56,000, but the committee thought that a design of a less expensive character would meet all the requirements. The site extends from Charterhouse-street to Snow-hill and from Farringdon-road to the London, Chatham, and Dover line. All the excavations have been performed, so that the basement can be proceeded with. To form the approaches, King-street has been widened on the northern side, a new street from King-street into Charterhouse-street, and another new thoroughfare from this street to the junction of Snow-hill and Farringdon-road, have been made, and part of the London, Chatham, and Dover line has been covered in. The matter now awaits the Common Council's approval of an agreement to be entered into by the railway company and the Corporation. This market, when complete, will be the last of the series designated in the Act as the London Central Markets—viz., the Meat Market, the Central Poultry and Provision Market, and the Central Fruit, Vegetable, and Flower Market.

THE first ordinary general meeting of Mr. Ruskin's Company of Guild of St. George was held in Birmingham last week. The company was formed for the purpose of buying land in England, and thereon to train into the healthiest and most refined life possible as many men, women, and children as their land can maintain in comfort. The vital principle of the guild is that whatever profit is made out of the management of the land is to be applied to the comfort and welfare of workmen themselves. Alderman Baker presided, and a letter was read from Mr. Ruskin, in which he said, "I never contemplated any legal difficulties of the kind I meet with, and I entirely decline any further responsibility in such matters. The office of master, as defined in *For's*, is one of authority over persons voluntarily rendering obedience to great principles, and not authority enforced by law as at present constituted. For all the organisation of the Guild a clerk or secretary must be appointed to be responsible with directions from solicitors, for I am virtually dead to such business." A report from Mr. Ruskin was read stating that the Guild had estates at Sheffield, Bewdley, Cloughton, Mickley, Barmouth, and £500 vested in consols.

THE REV. J. B. STROTHER, formerly of St. Mary's Steps, Exeter, and now of Shaugh Prior—a remote parish upon the western borders of Dartmoor—has recovered the unique old font cover that formerly crowned the ancient moorstone font at Shaugh Prior Church. The font cover was found in an old linhay, or barn, the greater part broken and rotten, terribly damaged, and apparently quite beyond repair. Under the superintendence of Mr. Harry Hems, it was conveyed to Exeter. The crowning finial, which seemed altogether lost, was found in another house, adorning a rural chimney-corner. It consisted of a headless and handless Bishop, clothed in full canonicals, and carved in a spirited manner. The cover is now restored, and presents its original appearance as it was when, in the middle of the sixteenth century, it was originally

placed upon the font. Of spiral form, its place is a permanent one upon the font, and under no circumstances should it be removed. When baptism is administered, the sides of the lower portion work on hinges like wings, exhibiting the font bowl within; and in this baldachino-like canopy, the child is held and christened. No other example of such a cover is to be found in Devonshire, nor in any church in the West of England whatever. A few similar instances do exist of this odd arrangement, but they are nearly all in the Eastern counties. At East Malling, near Maidstone; at Tiechurst, at Walpole St. Peter, at Trovington, at West Walton, at Bramford, at Fringringhoe, near Colchester, and one or two other places, there are examples of like construction. The Shaugh Prior cover stands between 8ft. and 9ft. high, and is made of oak. It is octagonal in plan, and in its construction consists of three several stages. To the height of 3ft. it rises perpendicularly, each cant being filled with delicately carved running ornament, and surmounted by an enriched cornice; the diameter then lessens, and for another couple of feet or so it again rises perpendicularly, the angles being ornamented by carved work, whilst the eight corners have pinnacles, each surmounted by carved figures of priests in attitudes of prayer and adoration. Above this, the cover assumes a spiral form, the spandrels between the ribs being carved with pierced ornament of curious detail. The whole is surmounted by a mitred bishop, holding a crozier or pastoral staff in his left hand, and having the other raised in the attitude of benediction.

THE death is announced at the age of 76 of Mr. William Leslie, of Nethermuir. The deceased, who was a native of New Deer was a self-educated man, and well known in the Eastern Highlands for his ability as an architect and his enterprise as a railway contractor. His greatest work was the designing and construction of Duurobin Castle, Sutherlandshire, built in 1845-9, at a cost of £120,000. Forty years ago he built a tower to Aberlour House, on the banks of the Spey, and he also executed a number of important works in Aberdeen. He was a member of the firm of Macdonald and Leslie, who first started the granite-polishing trade of Aberdeen. As a railway contractor he constructed the Deeside, Buchan and Forfar, Devon Valley, Perth and Dunkeld, and Forfar direct railways. In 1872 he acquired the estate of Nethermuir in his native parish, at a cost of £63,000. He was lord provost of Aberdeen from 1869 to 1874.

THE LIVERPOOL ENGINEERING SOCIETY held its usual fortnightly meeting on Wednesday evening last. Mr. M. E. Yeatman, M.A., President, occupied the chair. A paper on "The Design and Construction of Sewers" was communicated by Mr. Graham Smith, past President. In opening his subject he remarked that sewers should not only be constructed in a manner to carry with despatch to the outfall the sewage which might find its way into them, but they should likewise be built in a manner such that no portion of the sewage should percolate through them into the surrounding earth. Cholera, for instance, might be spread indefinitely by matter discharged from the stomach or bowels of a cholera patient gaining access to any source of water supply. He quoted the General Board of Health returns to show that zymotic diseases largely exist and are much due to improperly constructed sewers and imperfect drainage arrangements. The question of the proper forms of sewers to be adopted under various circumstances was dealt with at some length, and the author advocated the circular section when a large and constant flow could be depended upon, and the egg-shaped sewer when a variable flow had to be accommodated, as the smallness of the invert increases the scouring action of a small quantity of sewage, whilst the increased size of the upper portion provides for any augmentation of flow. He considered that the success or non-success of any system of drainage depended upon the manner in which details were arranged. These questions, and such others as the ventilation of sewers and the materials employed in their construction, were fully considered.

THE *Times* and other daily papers of the 26th ult. published the astounding information that "M. Eugene Millet, the Archbishop who restored Rheims Cathedral and St. Germain's, is dead."

M. Millet was an architect, and did not belong to the clerical order, though his connection with Rheims Cathedral and other ecclesiastical buildings throughout France, may have led to the mistake. He restored the Palace of St. Germain, now fitted up as a museum, and was one of the first who followed M. Viollet-le-Duc in his studies of the ecclesiastical architecture of the country, and subsequent practice in the restoration of the ancient Medieval building of the country.

THE Adelphi Theatre has undergone a thorough renovation, under the immediate direction of Messrs. Gatti's architect; Mr. Green Chadwick, of Parliament-street. Knowing the dingy monotony of the theatre before its decoration, we can say that Mr. Chadwick has made this popular and cosy little house still more attractive. The structure was in the Italian Renaissance style, but the interior suffered from a tawdry kind of decoration. The effort made has been to adapt the new colouring and decoration to the style of architecture, and chiefly to make it assist in giving size and scale to the interior. Generally we observe that the scale of colour has been reduced in tone, a vellum and a light blue being the predominant tints, employed with a liberal use of gilding in the gallery fronts and details. The lighting also has been arranged so as to destroy the effects of shadows, and we observe that bracket lamps, in pairs, have been placed on each side of the pillars of the auditorium, and a crystal chandelier by Messrs. Defries, is suspended over the latter. An ingenious mode of giving apparent height to the theatre has been adopted in covering the circular level soffit of ceiling above the gallery with a light striped paper, the stripes being arranged to radiate from the domed centre; the effect below is to make this flat, annular portion of ceiling appear conical or raised, after the manner of a tent. The domical ceiling over the auditorium is relieved in the lunettes or panels with a series of subjects representing the "Golden Age," executed to imitate fresco by J. M. Allen, Esq.; and the vestibule to the Royal box has its ceiling decorated with a symbolic design, "Innocence." We notice, too, new curtains to the private boxes. These are made of a rich gold-coloured satin, the edges being of peacock blue velvet. The boxes are lined with a light-blue satin cloth, with vertical stripes of vellum-coloured material, edged with a gold moulding, the effect of which is rich and to give height. We observe, also, the boxes behind the dress circle have been removed, and we are told the acoustical effect has been improved thereby. Other alterations have been made in the upper gallery, by which the comfort and control of the occupants of this part and the amphitheatre will be secured. We dislike the pattern of the paper to the gallery ceilings, which hardly agrees with the curvilinear surfaces; but we notice a good dark dado paper to the passages and stairs, imitating stamped leather. The decorations have been carried out by Mr. Crossley, of Newell.

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CHIPS:

The contract for building a Wesleyan chapel at Perranwell, to hold 600 people, together with a schoolroom and class-rooms, has been entered into with Mr. John Blight, Redruth, in the sum of £1,750. The style is Early English Gothic, and the plans have been prepared by Mr. Hicks, of Redruth.

An exhibition of the drawings of the late H. Dawson will be opened at the Fine Art Society's galleries, 148, New Bond-street, on March 3. It will consist of some two hundred sketches and

drawings which have never been previously on view. The proceeds of the exhibition, which will only remain open until Easter, will be devoted to the Artists' Benevolent Fund.

A scaffolding is now in the course of erection in front of Ipswich town hall, to restore the cornice, &c., as a cantilever fell down a few days since, killing a young man. The town hall is a large Venetian structure, built about a dozen years since from the designs of Messrs. Bellamy and Hardy, of Lincoln.

At a public meeting held in the town hall, Waterford, last week, the mayor in the chair, it was resolved to open an Art Loan Exhibition in the city on the 1st of May next. A guarantee fund was opened in the room, when nearly £100 was subscribed.

The Church of St. Paul, Poole, is about to be enlarged and improved at a cost of £3,800 from the designs of Mr. G. R. Crickmay, of Weymouth. The proposed works include the throwing out of an apse and the addition of side galleries, and 200 additional sittings will be provided.

The Littlehampton Local Board have instructed Mr. Grantham, C.E., to prepare plans for a water supply for a present population of 6,000, with powers of extension for one of 10,000.

The Billericay Highway Board have accepted the tenders of Mr. John Cross, of Hutton, for the erection of foot-bridges at Hutton-wash and Meringtons.

The Hunstanton Cliff Company have accepted the tender of Messrs. Bardell Bros., contractors, for carrying out sea walls, shelter, and other improvements at Hunstanton. The works will be commenced in the spring.

The Society of Arts has just sustained a severe and sudden loss by the death of its well-known and greatly respected secretary, Mr. Peter Le Neve Foster.

A public laundry has just been erected in the Bridport-road, Dorchester, for a private company. Mr. G. J. G. Gregory, of Dorchester, was the architect, and Messrs. Gay and Sons the contractors; the cost of erection was £1,500.

Mr. George Fawkes, who had been town surveyor of Cricklade for 26 years, died last week.

Darsham Church, East Suffolk, was reopened on the 12th inst., after having been reseated and otherwise restored. The work was superintended by Mr. S. Brooke, of Croydon, who carried out in detail the plans prepared by the late Mr. E. Hake-well, architect, of Great Bealings. Mr. H. Mountain was the builder.

A watchmaker in Ayr has left the whole of his estate, amounting to about £10,000, to rebuild the bridge in the town which was rendered famous by Burns as the "Auld Brig o' Ayr."

A new lodge is in course of erection at the eastern entrance to Kingston Lacy Park, near Wimborne, from the designs of Mr. T. H. Wyatt. It is Italian in style, and in keeping with the mansion, built about 1663. Mr. A. H. Green, of Blandford, is the builder.

The French Government has, through the Minister of Public Instruction, conferred the distinction of Officer of the Academy on Mr. G. Tinworth, designer of Doulton ware, in recognition of his services to public instruction and to the Universal Exhibition.

The Todmorden Local Board last week accepted tenders, amounting in all to £2,103, for the erection of a new town hall.

The Essex Church Building Society have recently made the following grants in aid of church restorations:—Black Notley, £50; White Roosting, £40; Stanway, £60; and Wimbish, £30.

New shops have just been completed at the corner of English-street and the Victoria Viaduct, Carlisle, for Messrs. Johnston Bros. Messrs. Hetherington and Oliver were the architects.

Thomas S. Derham, general merchant, of Leeds, has filed a petition for liquidation by arrangement. First meeting, March 13, at Calverley Chambers, Victoria-square, Leeds.

Mr. Edward Rundle, for many years architect and surveyor for the Duke of Bedford's Tavistock estate, has been appointed steward of the same estate.

Memorial stones of a new Primitive Methodist chapel have been laid at Heworth Colliery Village, near the Felling. The plans have been prepared by Mr. Jamieson, of Belle Vue-terrace, Gateshead; and the contract has been taken by Mr. Thomas Dixon, of Windy Nook. The building will be of stone, and that the character will not be very expensive may be gathered from the fact that it is proposed to seat 220 persons at a total cost not to exceed £300.

A new church room, built on the western side of St. Martin's church, was opened at Dorking on Monday. The plans were prepared by Mr. W. R. Hawkins; Messrs. Goddard, of Farnham and Dorking, were the contractors; and the work was carried out at a cost of about £1,100, under the superintendence of Mr. Dibble.

Roskelton Episcopal Church, Monbraith, in the diocese of Leighlin, was reopened on the 21st inst., after restoration, including the substitution of benches for square pews, and the replacement of pulpit and reading-desk by more modern ones.

A donation of £20 has just been received from the Goldsmiths' Company, for technical education, at the Royal Architectural Museum.

Messrs. H. and J. Mabey, of Westminster, are the sculptors of all the carving at the new buildings in the Temple, which we described last week. The models were also prepared by Mr. H. Mahey.

The Town Council of Margate have decided to purchase the water-works supplying the town for £59,000.

The East Grinstead Sanitary Authority have received the sanction of the Local Government Board to the borrowing of £13,000 for carrying out a scheme of drainage, and have accordingly invited tenders for the execution of the work.

In the 34th annual report of the Newcastle and Gateshead Water Company, presented yesterday, it is mentioned that more than 12 miles of mains and pipes have been laid during the past year, and that at the present time a large new reservoir is being erected at Swinburn.

School of Art classes have just been formed at Crewkerne.

The tender of Messrs. Guynan and Son, of Carburton-street, has been accepted for the supply of the blinds and fittings at the new school buildings erected at Sittingbourne for the Borden School Trust.

In our last issue we omitted to mention that

the whole of the principal rooms in the Reform Club, Liverpool, were warmed and ventilated by means of Shillito and Shorland's patent Manchester grates.

The tender of Mr. Alfred Groves, of Milton-under-Wychwood, Oxon, has been accepted for the rebuilding of Little Rollright Bridge, for the county of Oxford, under the superintendence of their surveyor, Mr. H. J. Jollit, St. Aldate's, Oxford.

Considerable alterations and improvements to farmhouse and buildings at Barrington Down Farm, Gloucestershire, for Mr. R. H. Hurst, are about to be carried out, and new cottages erected by Mr. A. Groves, Milton-under-Wychwood, Oxon.

St. Augustine's Church, Norwich, which has been temporarily closed for restoration, was reopened on Sunday. The old vestry, which occupied the south-east corner of the church, has been taken down, and a temporary one opened out under the tower at the west end. The architect was Mr. R. M. Phipson, and the builders were Messrs. Downing and Son, of Pitt-street, Norwich. There are still several things needed to make the restoration of the interior complete.

A school of art has just been re-established at Bridgwater, with Mr. Davis as head master.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Society of Arts. Cantor Lecture No. 3, on "Dwelling Houses: their Sanitary Construction and Arrangements," by Dr. Corfield, 8 p.m.

Society of Engineers. Paper on "The New Pits and Hauling Machinery for the San Domingos Mines in Portugal," by J. Bernhays, 7.30 p.m.

WEDNESDAY.—Society of Arts. "The Social Necessity for Popular and Practical Teaching of Sanitary Science," by J. J. Pope, M.R.C.S., 8 p.m.

British Archaeological Association. Dr. Phené on "The Cave of the Oracle of Delphi," and C. W. Dymond, C.E., on "The Stone Circle at Gunmerfeld," 8 p.m.

THURSDAY.—Society for the Fine Arts. Lecture on "The Art Decorations of the Stage," by W. J. Allen, hon. sec.

FRIDAY.—Society of Arts. "The Plants of India adapted for Commercial Purposes," by J. R. Jackson, of Kew Museum, 8 p.m.

Institution of Civil Engineers. Paper on "The Interlocking of Points and Signals, and the Electric Block System," by George D. Marston, Stud. Inst. C.E.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 7, 1879.

WATER-COLOUR DRAWINGS AT THE DUDLEY GALLERY.

THOSE who are admirers of skilful drawing and refined bits of colouring will not fail to enjoy the newly-opened Exhibition of Water-colour Drawings at the Dudley Gallery. There is nothing grand or ideal in the collection; we did not see one strikingly large or alluring picture on the walls, but the collection is made up of many pieces inspired by natural scenery and the commoner incidents of life, which please if they do not enthral the visitor. Rural and coast scenes, and a variety of studies of home life in which the tenderer emotions are chiefly concerned, comprise the larger number of works this year, though in these comparatively humbler efforts of the artist we meet with not a few admirable for their execution, their delicacy of drawing or colour. The sensational, whether it be in theme or treatment, is noticeably absent. Taking the order of hanging—we may here complain of the number “skied,” or placed too low for inspection—“The Young Wife” (8), by Ellen Clacy, is more remarkable as a misnomer than for anything characteristic, as all the artist represents is a young lady examining a piece of old china in a window, while the rest of the composition displays a goodly array of blue china in a hall recess. The title of “Curioso’s Wife” would be more appropriate. In “The Prayer,” Mr. N. Cipriani gives us a clever drawing of a dark row of stalls, apparently from some Spanish church. In one of them kneels a suppliant. Mr. S. T. Whiteford’s “Church of St. Satiro, Milan,” is forcible in colour; a vigorous handling of foliage is Mr. W. S. Addison’s “Marsh Marigolds” (19). There is a freshness in the picture, which is executed in a massive style with body colour freely used. No. 21, “Goring-on-Thames,” by Mr. A. C. Bell, is a delicately-handled landscape, although the treatment is broad. Truthful as a transcript is Mr. B. N. Spiers’ picture called “A Corner of My Study” (24), in which a few leather-bound books and an ink-bottle make up a modest but by no means inexpressive subject. Mr. Ernest A. Waterlow in his “Rear-Guard of the Flock” (33) has also chosen a simple rural scene. A girl with child on her back is driving a flock of sheep. The road, with its pools of water, the dark foliage and the sunset sky, the figures and the sheep are all conscientiously drawn. “Venice in June” (34), by Mr. H. Goodwin, is a gaily-coloured view of a scene painters never tire of depicting. For bold and truthful rendering of Highland cattle we commend Mr. J. Richardson’s work, “A Highland Mother” (39), while marine painting is well represented in Mr. Goddard’s “Hurst Castle, Hampshire” (40). As architectural sketches, the contributions of Mr. Phené Spiers leave little to be desired. His “Old House, Rye,” a timbered ruin, is hung too low to do it justice; but the most successful sketch is “Gloucester Cathedral from the South-east.” Mr. Spiers is certainly a master of sketching in colour; his washes are clear and transparent, and in the sketch before us there is a charm in the manner in which the elaborate detail of the tower and Late east window is expressed by a warm light shadow tint without an over-laboured execution. “Tintern Abbey from the South Aisle” (199), and the “Bishop’s Palace, Wells” (527), with its charming oriel, are also pleasing studies. We cannot pass by Mr.

W. T. Richards’ powerfully-coloured piece entitled, “Twilight—Coast of New England” (52). The light on the water, the rocky headlands, and the general tone of colouring make a highly effective scene. For figure-drawing broadly coloured, Miss Beresford’s “Under the Convent Wall” must also be mentioned, simple as the subject is. We notice, too, Mr. Egerton Hine’s “Tin Ghant, Whitby” (70); Mr. J. Moore’s “Lord Leveson” (72); Mr. McFadden’s “Roman Arch Bridge, New Forest”; Mr. F. C. William’s “Lynn Idwal, North Wales” (75); excellent subjects, all characterised by masterly execution—the latter a skilful rendering of mountain and mist. A kind of droll humour is depicted in Miss Kate Greenaway’s “Prissy” (79); a demure-faced little girl dressed in a sage-green frock, with white cross-over, wide brimmed green hat, standing against a wainscotted background; the same artist’s “Morning Call” (136) exhibits another study of a girl clad in similar antiquated attire—a red cloak, her mamma’s muff and bonnet, seated on a high chair. The precocious and sober countenance of the little mimic is as cleverly drawn as the subject is comical. One of the most attractive pictures is the work of another lady artist, Eliza Walker (95). A young lady in a brocade dress of golden hue, holding in her hand a black fan, stands before a pier glass; the reflections of face, the rich-painted china vases on the mantelshelf, and the hawthorn blossom are faultlessly painted, and the title is cleverly realised. The revival of the old costumes of the time of the early Georges has been eagerly turned to account by the depicter of manners. Thus, Mr. F. Slocombe’s “Scrap Book” (109) is a girl dressed in the low, short-waisted dress of our grandmothers, seated in a dingy room of old-fashioned furniture, a cat being her solitary companion. The screen and accessories are clever. “Sweet Seventeen” (116) hardly realises its name. The subject of the picture is a young girl dressed in muslin, with large hat and blue sash. The expression is rather that of a spoilt child than a young maiden, but the attitude is easy and graceful, and the basket of fruit in her hand, the fruit-laden wall behind, and the general colouring are refined and natural. The artist is Mr. E. S. Guinness. Mrs. Victoria Hine’s “Old Houses, Sandwich, Kent” (118), is a picturesque group of brick gables truthful in colour. A striking picture of sea and storm in their grander moods is called “The Surf-beaten Shore” (135), by Mr. G. L. Hall. As a study of cloud and atmosphere, the artist has shown unmistakable power over his pencil, but Mr. Hall is an adept at effects of this sort. Of an intensely natural style of execution is Miss Alice Havers’s picture (129)—

“The kine, the kine, are onward going,
As o’er the hills the winds are blowing,
They wander onward, ever lowing.”

Few would stop, perhaps, to look at so commonplace a subject as a few cattle wending their way over a bleak moor, but the drawing is very faithful. More inviting in its theme is Miss Kate Sadler’s “Satisfaction” (153), an old monk seated engaged in illuminating a missal. The artist has seized a moment of serene satisfaction in the countenance of the old recluse, and the china and green dresser are cleverly introduced. Rich toned, and striking for its pleasing face, is Catherine Atkins’s “Reaper” (176), painted with considerable feeling and tenderness. Mr. A. B. Donaldson’s “Leycester Hospital, Warwick,” is a quaint courtyard, with its galleries of timber parget, but harsh in colouring. Another very fine coast scene is C. Davidson’s sketch from the “Cornish Coast, near Tintagel” (185); a bold piece of colouring, with its verdure-clad cliffs, and its green and purple-

hued sea. Mr. Fitzgerald’s “Return from the Mask Ball” (187), is a frenzied idea cleverly worked out. Mr. G. D. Leslie, R.A., is always happy in his studies of character. “Curiosity” (194), is a pleasing incident that tells its own story. A little girl is peeping into a wardrobe or cupboard. The drawing of the figure, on tip-toe, clad in a white dress, the arms and expression, are exceptionally skilful. Another piece, entitled “Security” (211), by H. Stacey Marks, R.A., cannot be passed by. The old chest, of late French or Flemish, and the drawing of the old man, keys in hand, are full of meaning, and conveys the idea the artist has sought to produce. “The Manse Gate” (235), by Catherine Sparkes, is excellently conceived. The figure of the rosy girl descending the steps, the cool green background setting of the garden, the half-reflected light on the wicket combine to produce a very pleasing picture.

There are several very excellently-drawn subjects that come within the broad designation of *genre* and “common life.” Of these we can only name Mr. E. Jennings’s “Suburban Gardens” (223), a grey-toned picture of winter with the ordinary suburban surroundings. “A Surrey Hayfield,” by Mr. Slocombe, clever in the light falling on the hay; “London Shoeblacks” (243), by E. Roessler Franz; “An Afternoon’s Enjoyment,” a clever study of cattle; “The Hour of Recreation,” by C. Cabianna (271); “The Thames at Battersea,” 1879, by Arthur Severn (287), a rendering of grey mist and rain such as Londoners only know; “Three Merry Men are We,” by F. Dadd (297); “Breakers on a Reef,” very clever in the reflected light on crest of waves and the misty effects, by W. T. Richards (295); “A Rough Day in the Channel,” by H. Anelay (299); “Weeds,” by A. Parsons (319); “Contentment” (320), by J. Knight; “A Picture of Open Common” (322); “Waiting,” by G. Knight (332); “A Duet in Low Life” (341), by A. Ludovici; “Japanese Interior,” “Peasant Life in the Campagna,” by E. R. Franz; a sketch of a “Sandy Shore” (436), by C. J. Barraud; “La Plus Sage de l’Ecole,” and many others on the screens, such as Mr. Addison’s “Coppice,” “Long Ago,” by C. J. Atkins; “Recreation,” by C. A. Smith; “From My Window,” P. Norman (578). Mr. Hanbury’s “Side Chapel of Church of St. Maria de Popolo, Rome” (252), does not do justice to the rich marbled interior, and the drawing is poor. Decorative in character is Mr. F. H. Jackson’s picture (269) from the text—

“Red roses fair,
To wreath my love that wanders here,” &c.

The conception is poetically worked out. M. F. Sutherland’s picture, “In the Mary Stuart Room, Hardwick Hall” (275), is a richly-coloured sketch of old chair and chintz. As a landscape, Mr. A. Hartland’s “Coming Storm, Cwm Bychan” is fine; and in another class of art, Mrs. Champion’s “Flowers for Our Lady’s Shrine” (374), showing a sister making a wreath, is tender and pathetic. “Perdita” (371) is a pretty conceit, allegorically-treated, over-florid, by Kate C. Hastings, while “Thinking” (388), by C. J. Atkins, is clever chiefly as a study of accessories, such as the china and the furniture. Catherine H. Sparkes’ picture illustrating Matthew Arnold’s “Judas” is forcible and dramatic; the “furtive mien” and “scowling eye,” the “red hair” and “tufted fell” of the poet are seized by the artist in his conception, and the galleon and crew are well drawn. A finely-painted coast-scene is Mr. Walter Severn’s “Trevalga Rocks” (387); the ripples of the sea and the rocks are bright and transparently coloured. “The Harbour Bar” (410), by G. L. Hall, is a clever conflict between black cloud and surf-beaten sea, and the picture has the depth of oil. Mr. P. Williams’ “Church of St. Stefano, Venice” (411), is, as a severe sub-

ject, massively handled; and "Enone" (420), is expressive study of features, delicately rendered, by Mary Mason. We have contented ourselves with a mere glance at the collection, which is a very numerous one. We cannot, however, omit to mention some charming bijou flower-subjects; Nos. 617, 571, 502, 196 are especially worth notice. The models for statuettes are worth inspection. Mr. G. Simonds' "Eros Victor" is a pleasing conception, while "Charley," by E. R. Mullins, is a model in which the qualities of simplicity and truthful technique are undoubtedly combined.

THE CARPENTERS' HALL BRONZE PANEL COMPETITION.

PRIZES were lately offered by the Carpenters' Company in this journal for designs to be executed in bronze for the panels in the basement pilasters of their new building now in progress of completion in London Wall. Before saying anything about the designs submitted, we may incidentally observe that the new structure is a massively treated, ashlar-faced building in the Roman style, the entrance front of which is towards the old Carpenters' Hall. Mr. Pocock, the architect, has adopted a bold columnar treatment in the façades. They are of one order, the Corinthian, and the columns rest upon a solidly designed basement, in which are sunken panelled pilasters of some projection. The main order is composed of three-quarter columns, above which the entablature breaks, the whole being surmounted by an attic and balustrading. In the inter-columnar spaces are pedimented windows set within relieving arches, and these are flanked by Ionic columns. Below the entablature, and between the capitals and keystones, the spandrels are enriched by festoons boldly carved. In the basement plain segment-headed windows appear, the jambs of which are relieved by a hollow and plain grooved enrichment. The angle pilasters to each façade are rusticated, and the four intermediate ones have deep moulded panels, the intention being to fill them with bronzes. These panels are 13 feet 6 inches high by 2 feet 4 inches wide. The competitors had to consider, not the principal order or story of the building, but the basement only; they had to prepare a design that could be cast, not carved; and, lastly, the scale of the work in its relation to the façade had to be kept in view. These conditions have, of course, been violated by many of the competitors, and there are only two or three designs that fulfil fairly the condition of suitability to position, only two that express cast work, while as regards scale only one of the competitors can be said to have thought of it at all. As a whole, the designs are disappointing. Taking them in the order in which they are numbered, Mr. Banks sends three alternative treatments, one showing a figure in canopy, with compass and shield below; another has a centre group of carpenters' tools, and a third a head; but the lower portion of each panel is filled with an unmeaning composition in a species of rococo, and there is in all three drawings a crowded effect. The chief fault, to our mind, is that the designs lack character, and they are much more suited for interior wood carvings in an Elizabethan hall. As full-size drawings they are otherwise creditable. No. 2, by Mr. J. Daymond, of Vauxhall (we believe the stone-carver engaged in the new hall), is represented by three cartoons, of which we much prefer the design showing an octagon panel with figures in relief in centre, the lower part being filled with a composition in which a pedestal and stem growing therefrom, with scrolls, are the leading elements. The other designs have centre medallions, charged with emblems and the arms of the Company, filled up at top and

bottom with foliage and scroll-work, the latter becoming subordinate. To both these the objection is that they do not fill the panels, and would be far more consistent in a flat or horizontal than in a vertical position. The conception, moreover, is sadly lacking in the architectonic character which ought to be primarily kept in view, and the artist's idea is more characteristic of stone-carving than cast-work. We cannot seriously discuss No. 3; it is beyond criticism. The artist (Mr. J. How) has conceived something more nearly approaching a huge *bon-bon* than anything else we can think of. It is, in fact, a reticulated cage, circular in plan, with the Company's arms in centre and a crown at the top, projecting from the panel. Design 4 represents a brawny artificer, with axe in hand, the other parts of panel being filled with oak foliage. The design is weak. We would simply make the remark here that a large figure is very questionably introduced in such a position. One of the best designs is No. 5, by W. H. Binger; its conception is more architectural, and the relief indicated better adapted for bronze than those of previously mentioned designs. An oval panel with a representation of the craft forms the centre, above and below which are emblematic compositions, the subjects being surrounded with a water-leaf moulding. The treatment is scarcely bold enough for the positions. Another clever design, by Messrs. Cox and Sons, is in too elaborate a style of Renaissance to suit the basement of a building, in which solidity of character has been aimed at. The artists send two designs; both have centre medallion subjects, one representing Egyptian artificers at work, another a Renaissance subject. The designs would be well adapted for interior decoration, but for the position intended there is a want of scale in the work and figures introduced in the lower compartments of panel. The next design, No. 7, exhibits a bolder and more characteristic treatment. The artist (Mr. Hugh Stannus) has not overlooked the essentially architectonic position and attributes of such a work; the design is suited to bronze bas-relief, and comes within the limits of cast metal ornamentation. In one of the designs there is a circular panel with a seated figure of "Industry," above and below which are emblematic devices in allusion to the craft are appropriately introduced. At the top is a cherub's head, and a scroll with "Honour God" inscribed. The branching cornucopias below form a pleasing filling-in to the panel, which is surrounded by an enriched moulding. We observe also in a sketch elevation indicating the relation of the panels, that the tablets are made to range with the rustications, and the lower ornaments are kept in low relief so as to be less liable to injury from rough usage, both desirable points. Another clever design is No. 8, shown by vigorously coloured brown drawings. The designs exhibit trophies of carpenters' tools suspended from heads, in the composition of which the author has shown more ingenuity in grouping than good taste. The heads are too large, and the trophies have a crowded and lumpy effect, and certainly indicate by the relief a carved rather than cast treatment, which are evident faults. In contrast to the last, Mr. R. J. Boreham adopts the idea of growth instead of pendulous ornamentation. There are vases at the base, out of which foliage springs; but the design lacks boldness, and is only suited for inside decoration. No. 10, in pencil outline, is carefully drawn, but, like the last, is weak in conception, and the ornamentation is much too elaborate for basement pilasters. In marked contrast is the next, by Henry E. Tidmarsh, of Hornsey Rise, a bold chalk design, showing a rigid stem-like composition, with suspended trophies, wanting in grace and connection. The lower parts of panels are left plain stone. No. 12 shows female figures in

niches, with trophies and arms at the top and sides. The design is only suitable for stone. There is one other design, but it is of quite an unsuitable character. From our remarks it will be seen there are only two or three designs which fulfil the conditions upon which alone a selection can be made. In every other case the scale of the decoration and the treatment are at fault. Nothing in the panels should detract from the sculptured ornamentation of the superstructure; on the other hand, the relief should be strictly architectural and suggestive of cast metal. No models have been sent, but the Company will have little cause to complain; some of the drawings are separately worth the prize offered.

THE HARVEY STATUE.

FROM a large number of designs received for a statue to Harvey, the discoverer of the circulation of the blood, three models have been selected by the Committee for further consideration, and these are now on view at the South Kensington Museum. The statue is intended to be erected at Folkestone, the native town of Harvey. But there is a national interest felt in the memorial to so celebrated a physiologist, and the adoption of a model at once appropriate and artistic is a matter of public concern. We have inspected the models in the picture gallery at South Kensington, and while it would be rash to offer an opinion as to the result of a competition out of which only three designs have been selected, we consider that a larger display of designs would have been more satisfactory. Without doubt the three models exhibited are works of considerable merit, and if these are the three best procurable we have no hesitation in deciding upon the one that appears to embody the most desirable attributes as an artistic work. We presume the letters placed on the three models indicate the order of merit assigned by the judges, and if so, we think the least satisfactory has been chosen. The model marked A shows the great Linnæan lecturer in a standing attitude, with a note-book in his left hand, his right holding a heart, as if in the posture of demonstrating as a lecturer. His head is bent downwards, and he wears a flat cap and a kind of Genevan gown over the conventional costume, which consists of the slashed or buttoned doublet, short breeches, and stockings, common in the time of Charles I. There is a want of repose and gravity in the figure, though the face is highly intellectual, and on the whole it must be said the attitude is not dignified enough for a statue. It is a mistake made by young sculptors to conceive their ideal in too realistic a spirit, and to emphasise the professional vocation rather more than good taste dictates. This appears to us the mistake in the conception of the artist here. The design B is in our opinion marked by more of the qualities of a good statue. The artist shows Harvey in an upright and dignified attitude, his left leg slightly advanced. In his left hand he holds a heart, while his right hand is pressed to his own, as if in intelligent outward expression of his thought. The head has been modelled from the portrait of Janssens, we are told, now in the College of Physicians, and is eminently thoughtful and handsome. The figure is dressed in a buttoned and trimmed doublet with deep collar, short trousered breeches, and tight stockings, a cloak being hung loosely from his shoulders. The beard is trimmed to a point, and there is a decidedly Spanish or Vandyke style about the costume. The shoes have rosettes. The face is open and benignant, and features particularly intelligent and expressive. Unfortunately, the yellow stained wooden pedestal detracts from the model as an artistic whole.

Design C is also a clever composition. The physiologist is shown similarly clothed, but the cloak is loosely thrown on a tripod behind, and the artist has evidently endeavoured to portray Harvey in the position of a demonstrator or lecturer, as he holds in his left hand a heart, and in his right, as if in the act of performing an operation, is a lancet or probe. Behind, at the feet, lies a dead stag, from which the operator has apparently extracted the heart he holds up in his hand. The expression is intellectual; but while there is considerable ease and dignity in the figure and its accessories, the artist has, we think, fallen into the error of giving us the anatomist rather than the great discoverer and physician. The pedestal of this design is far too elaborate, though more architectural. Panels, with wreaths and serpents, relieve the sides, across which are tablets with the inscriptions, "Born, Folkestone, 1st of April, 1578," and on the other side, "Died, London, 3rd June, 1657." We understand this design has elicited much admiration from many who are not critical enough to see that a carved pedestal invariably detracts from the sculptor's principal work. The pedestal has in this case found admirers. From the above remarks it will be noticed that we prefer in conception, grace of attitude, and expression, the design marked "B"; and we hope the judges will not lose sight altogether of the idealistic qualities in balancing the technical merits of the several designs. Nor is it too much to demand in a public statue of a great man such as Harvey that the skilful operator be subordinated to that of a far-seeing physiologist and benefactor of mankind.

ARCHITECTURAL GEOLOGY.—V.

PALEOZOIC OR PRIMARY ROCKS.

CARBONIFEROUS GROUP.—The series of formations which we have now to consider is one of the most important in this country on account of the numerous coal-seams which are found in it, from whence it derives the name of "Carboniferous," although the coal itself forms only a very small part of the series, which is made up of sandstones, clays, shales, and limestone, alternating with the seams of coal. Our present business, however, is with the stones and other minerals which the carboniferous strata yield for the use of the builder, so that we shall leave the coal altogether out of consideration. In this country the carboniferous strata are found in large isolated patches, to each of which the term "coal-field" is commonly applied; thus we have the Newcastle coal-field, the coal-field of Yorkshire, Lancashire and Derby, the Dudley coal-field, and the South Wales and West of England coal-fields, all of which have some peculiar feature. There are three principal divisions of the group in England and Wales; the upper strata in which coal is mostly found being called the "Coal-measures"; the middle, which consists of thick beds of hard coarse sandstone, known as the "Millstone Grit"; and the lower strata, which is composed chiefly of hard massive beds of limestone with occasional beds of coal, termed the "Carboniferous or Mountain Limestone." In Scotland the Carboniferous Limestone immediately underlies the Coal-measures; the Millstone Grit being wanting, thick beds of sandstone with thin coal-seams being found below.

Coal-measures consist of a series of clay or shale, sandstone, and beds of ironstone with seams of coal, a bed of *fireclay* being found under every coal-seam, which is extensively worked for the manufacture of firebrick. Large quantities of sandstone for building and flags for paving are obtained from these strata, especially in Yorkshire, Lancashire, and Durham, as well as in those of Scotland;

these sandstones are generally very hard and durable, although most of them are highly laminated. The Newcastle coal-field covers a large portion of Northumberland and Durham, and yields in its upper series an excellent sandstone for building purposes, which is quarried at Heddon, Kenton, Hexham, Elswick, and other places. The stone of Heddon is coarse-grained, and weighs 130lb. per cubic foot, that of Kenton has fine grains and weighs 145lb. per foot; it is much used for buildings in Newcastle, and flags are obtained from the upper beds. Limestone suited for building is found near Morpeth, and flagstones about Berwick. There are several quarries of building stone near South Shields, and the Pensher-stone, near Houghton-le-Spring, is much used for buildings in Durham, Sunderland, and other places in the county. Redgate-stone, near Wolsingham, is fine-grained, and was employed in Durham Castle. Near Gateshead, Bishop's-Auckland, and Hartlepool good building stones are also procured from the coal-measures.

In Yorkshire there are extensive quarries of sandstone and flags in all parts of the West Riding Coal-field, chiefly in the neighbourhood of Leeds, Halifax, Bradford, Huddersfield, Penistone, Sheffield, and Barnsley. The Park-spring stone, found near Leeds, is a heavy fine-grained stone weighing 150lb. per foot cube, and is much used for architectural work. The quarries of Harehill, near Leeds, yield a fine grit stone for building, and also slabs and landings; that of Rawdon-hill, which has a fine grit, has been used in the Town Hall at Leeds, buildings in the London Docks, and at Woolwich Arsenal. There are also good building stones from the quarries of Headingley, Staningley, and Potternewton, in the neighbourhood of Leeds. The quarries around Halifax and Elland yield good building stone, and large quantities of flags, landings, and paving stones. There are some hard and heavy stones of excellent quality quarried in the coal-measures near Huddersfield, at Longwood-edge and Crossland-moor, which is much used for buildings at Huddersfield and Manchester. A large quantity of red, brown, and blue building stone, flags, and roofing slates is obtained near Sheffield, and employed in local buildings. About the neighbourhood of Northallerton are quarries of stone which is much used for buildings in several large towns; also near Bedale and Harrogate building stone is obtained from the coal-measures.

In Lancashire this formation contains many quarries of stone in different parts of the country, about Burnley, Wigan, Bury, Rochdale, Knowsley, and Liverpool. The stone of the Catflow quarries near Burnley has a light brown tint, is very hard and compact, and well suited for architectural purposes. Landings and flags are obtained in the quarries, but they are generally inferior in quality to those of Yorkshire. The coal-measures of Derby yield a coarse grained sandstone, some of which is obtained at the Duke's quarry, near Cromford, and has been used in the Victoria Docks at London. In the Forest of Dean coal-field of Gloucester many sandstone quarries are worked, and supply materials for local buildings and for paving. In Monmouth there are quarries of building and paving-stone at Newport and Pontypool.

The Coal-measures of Scotland cover a great part of Ayr, Dumbarton, Lanark, Renfrew, Stirling, Fife, Edinburgh, and Haddington. They abound in grits and sandstones, of which there are many quarries about Edinburgh, that of Cragleith yielding a stone of great durability and hardness which consists almost entirely of grains of quartz, and weighs 146lbs. per cubic foot. The stone from the quarries of Binnie and Humber, which have a finer grain than the

Cragleith, are much used for buildings in Edinburgh. Fine grained building stones with paving flags are obtained near Stirling and Falkirk, and there are several quarries in Fife, at Dunfermline, Saint Andrew's, and Strathmiglo.

The clay-beds of the Coal-measures are developed chiefly in Yorkshire, Lancashire, Stafford, and Worcester, where they are extensively worked for the manufacture of firebrick, red and blue building bricks, roof and floor tiles, drains and sanitary ware. In Yorkshire there are works of this kind in the neighbourhood of Sheffield, Rotherham, Barnsley, Leeds, Castleford, Halifax, and Huddersfield. In Lancashire firebrick is made near Barrow-in-Furness, Bury, Todmorden, Staleybridge, and Blackburn; building-bricks, drains and tiles being manufactured near Manchester, Bolton, Warrington, Toxteth-park, Liverpool, Rochdale, Haslington, Whalley, and Wigan from the clay of the coal-seams. Firebrick is largely made in Stafford and Worcester at Stourbridge, Bilston, and Tipton; and the clay is made into terra-cotta, drain-pipes, bricks and tiles at Bewdley and Tipton. Blue bricks are also made near Tipton, Cannock, and Birmingham; building-bricks, tiles and drains at Walsall, Burton-on-Trent, Newcastle-under-Lyne, Kidderminster, Congleton, and Tunstall. In Salep the clay is made into encaustic tiles at Benthall, near Broseley, and into bricks, tiles, and drain-pipes at Shrewsbury, Ludlow, Whitechurch, Shifnal, Oswestry, and Bridgnorth. Beds of fireclay are also found in the coal-measures of Durham and Northumberland, about Newcastle, Morpeth, Durham, Sunderland, South Shields, and Darlington, where it is worked for bricks, tiles, drain-pipes, chimney tops, &c. In Cumberland it is applied to similar purposes at Whitehaven, Maryport, Thursby, and Ravenglass. In North Wales the clay is made into bricks and chimney tops about Wrexham, Hawarden, Mold, Ruabon, and Conway; and into firebrick in South Wales at Aberdare, Swansea, Cardiff, Merthyr, and Brecon. The Coal-measure clay is made into bricks and tiles in Gloucestershire at Cinderford, Coleford, Easton, Micheldean, and in the neighbourhood of Bristol; in Warwick red and blue bricks and tiles are made from it at Atherstone, Coventry, Tamworth, Nuneaton, and Kenilworth; and in Leicester it is worked for red bricks and tiles at Ashby-de-la-Zouch and Melton Mowbray. In the Coal-measures of Scotland the clay is largely used for bricks, tiles and drain-pipes near Edinburgh, Glasgow, Paisley, Blantyre, Coltness, Kilmarnock, Kilwinning, Bothwell, Stonehouse, Coatbridge, and Wishaw.

Millstone Grit forms a series of coarse quartzose rocks which crop out along the edge of the coal-fields of England and Wales, where it forms the foundation on which the coal-measures rest; in South Wales and the South-west of England it is known as the "Farewell rock" on account of the absence of coal-seams in this formation. It is chiefly developed in the West Riding of Yorkshire, and is conspicuous at Alston-moor, Swaledale, Wensleydale, Ingleborough, and Pen-y-ghent; also at Pateley-bridge near Harrogate, in the Plumpton rocks at Knaresborough, and the Ilkley crags near Bradford. The grit quarried at Gatherley-moor, near Richmond, is largely used for building purposes about Richmond and Darlington. In the neighbourhood of Leeds and Selby there are several quarries of a coarse grit known as Bramleyfall stone which is largely used about Leeds as a building stone, and has been employed for the Euston Railway-station in London. Near Huddersfield a heavy grit weighing 158lb. per foot cube is quarried at Scotgate-head, and much used for local buildings; there are also numerous quarries of building stone, flags, and roofing

slates in the same locality at Longwood, Marsden, and Saddleworth. In the neighbourhood of Sheffield the grit is quarried at several places for ashlar, walling, flags, sills, and steps. There are also several quarries of building stone and flags about Southowram near Halifax, and at Ripon a freestone is obtained which is much used for local buildings. In Lancashire the Millstone Grit yields good building stone near Bolton, Preston, Wigan, and Liverpool. In Derby it is quarried at Ashover, Buxton, Matlock, Rowsley, Wirksworth, Belper, Chapel-en-le-Frith, Derby, Duffield, and at the Duke's quarry near Crick, where a purplish green stone weighing 144lb. per foot is procured, which is largely used for bridges, galls, and docks. The stone of Darley-dale, near Bakewell, weighing 148lb. per foot cube is much used for buildings of a superior class. In Warwick a hard quartzose rock called the Hartshill-stone is quarried near Nuneaton for building and paving, having been indurated by contact with igneous rocks. A grit is obtained at Prudham near Hexham, in Northumberland, and is much used for buildings in Newcastle; and in Durham there are quarries near Barnard Castle, Darlington, Stanhope, and Wolsingham.

Carboniferous, or Mountain Limestone, is found in England and Wales underlying the Millstone Grit and forming the lowest beds of the Carboniferous series; in Scotland, however, where the Millstone Grit is generally wanting, this limestone lies immediately below the Coal-measures. It consists for the most part of massive beds of a bluish-grey crystalline limestone, which is generally too hard to be much worked by the mason, and is chiefly quarried for burning into lime, although some of it is capable of receiving a polish and being used as marble for decorative purposes. The scenery of the country where the limestone crops out is usually of a rugged description, forming the cliffs and combs of Somerset and the dales of Derby. Copious springs of water are obtained from this formation, owing to the fissures in the rocks. In the North of England the term "Scar Limestone" is applied to the formation, which is developed at Alston-moor, Ingleborough, Pen-y-ghent, Wensleydale, and Swalesdale; a narrow strip of it also skirts the slate of the Lake district and passes along the Vale of Eden; marble is obtained from it in the neighbourhood of Kendal, as well as lime and building stone. The Carboniferous Limestone presents the most characteristic features and great uniformity in the counties of Leicester, Derby, Gloucester, Monmouth, Salop, and Somerset, where it forms a great calcareous mass undivided by bands of clay or other beds. In Leicester it is dolomitic in character, and is quarried for making into lime at Breedon-hill, Ticknall, and other localities. In the neighbourhood of Bristol it yields marble for decorative work as well as good building-stone. Marble is also found in considerable quantities about Matlock and Rowsley, in Derbyshire; and limestone obtained at Hopton-wood, near Chatsworth House and Belvoir Castle. Hydraulic cement is made from the limestone which is quarried at Holywell, in Flintshire. In Scotland the Carboniferous Limestone is quarried in the neighbourhood of Edinburgh and Dalkeith for building stone and lime, and also at several places in Ayrshire and Fife.

In our report of Dr. Corfield's lecture on "Household Sanitary Arrangements" in the BUILDING NEWS of the 28th ult., we state "a model of an automatic fastener, invented by Messrs. Thompson and Sons, of Birmingham, was exhibited and explained." The name should have been "Tonks and Sons." The fastener in question is that referred to as "Patent Sash-opener and Automatic Fastener" in the advertisement which appears in our columns.

HOUSEHOLD SANITARY ARRANGEMENTS.—III.

IN his third Cantor Lecture, "On Dwelling Houses," delivered on Monday evening at the Society of Arts, Dr. Corfield concluded his remarks upon ventilating and heating apparatus, and commenced the consideration of water supply. To show how air could be admitted to a room without perceptible draught, an experiment was performed. Two little flags were hung in a line with the nozzle of a pair of bellows; when the bellows were blown they waved, the agitation being more marked when a tube was added to the bellows. One of Ellison's conical brick ventilators being placed before the bellows, with the small hole next the nozzle, scarcely any movement of the flags took place till the bellows had been worked for some time. A device invented by Mr. Stevens, in which a series of uniform perforations ended in little metal cup-mouths placed behind a wire grating, was applied to the bellows with equally satisfactory results. Such contrivances for admitting fresh air to rooms without draughts ought to be placed high up in the apartment, and not in the skirting board, as was too often done. Unless the fresh air was warmed by passing over heated pipes, it would be too cold to be admitted to the lowest level of a room. M'Ilaffie's valve was exhibited and explained, it being shown that it would admit fresh air unless the wind was too violent, when it would be self-closed. Some galvanised iron-louvre ventilators, which are adjusted by a key, sent by Hart, Son, and Peard, were also shown. Dr. Ball's ventilator had a delicately-adjusted valve (which in the exhibited specimen was out of order), admitting air to a siphon-like passage; it was claimed for the siphon that blacks would thus be kept out, and that air would be "drawn up" more readily; but the lecturer expressed grave doubts as to the possibility of the latter claim being sustained. There were two or three kinds of stoves or grates connected with ventilation. That invented by Captain Douglas Galton had all round it an air-chamber, into which fresh air was admitted from outside, and after being warmed, was passed into the room. By this means, 35 per cent. of heat from the fuel was utilised. A variety of this was the Manchester School-grate, one of the differences being that air was admitted in a vertical direction. The caution was given that the back of the grate and the flue, so far as they were in an air-chamber, ought to be of one casting; if a joint existed, sooner or later it would open, and air would pass from the flue into the air-chamber. Some slow-combustion stoves had a provision for heated air returning into the room. This air was always too dry, the modifying influence of the water vessel set upon the stove being comparatively slight, and the charring of the organic matter in the air caused the peculiar smell known as that of "cast-iron." Mr. Saxon Snell had recently invented a contrivance known as the Thermo-hydric grate. It looked like an ordinary open fire, having near it a boiler connected with a series of vertical hot-water tubes, which stand round about as a range of pillars. The water in these pillars is heated, and thus assists in warming the room; and between the tubes fresh air is admitted into the room, and is gently warmed by the contact. These stoves were found to be too cumbersome to be brought to the Society of Arts' room, but might all be seen at any time on presentation of card at the Parkes Museum, University College. The lecturer next referred to the future prospects of gas. He believed that gas would be more largely used in its proper capacity, that of a warming and cooking agent. It was possible that for a long while it would hold its own as a light, but he did not think we should continue to use coal in the ridiculous manner we do now. We burned coal directly, whereas from it not only could gas be distilled, but tar, carbolic acid, aniline dyes, salts of ammonia, and other increasingly valuable products were obtained at the same time. It was perfectly absurd to suppose that we could go on wasting all these substances in our fires. In every large house the mere dust and dirt created by open fires was equivalent to the employment of two servants. The gas companies ought to be alive to this, and let out for hire gas stoves for cooking, as they now do the meters; but he warned his audience that if gas were used for culinary purposes, the present service pipes would be insufficient. Bunsen's stove was the best for these purposes. The notion that a gas fire was more unhealthy than one of coal was a

mistaken one; if equal care were taken to remove the products of combustion, the one need be no greater nuisance, nor more deleterious, than the other.

The lecturer then took up the question of Water Supply. There were certain obvious characteristics which a drinking-water should possess. It should be clear, colourless, free from suspended matter, forming no deposit if standing, without taste or smell, and aerated. If any of these qualities were absent, the water might be dismissed as unfit to drink; but it might have all these characteristics, and yet be unsuitable, because contaminated by sewage. The suitability of a water could only be ascertained with certainty by a knowledge of its history, added to careful chemical investigation. Waters might be divided into hard and soft. To say which it was advantageous to use was a difficult question. The disadvantages of hard water in that it clogged up pipes with deposits, and that more soap was needed for washing, were obvious, and the popular prejudice that soft water was preferable appeared supported by facts, including its invariable choice by domestic animals: the Registrar-General had proved however that, other sanitary conditions being equal, there was no difference in the average mortalities of towns supplied with hard or with soft water. But hard water might be softened—on a large scale by the use of Clark's process, which consisted in adding lime to water already too largely charged with lime, but the milk of lime united with that already in the water and was precipitated with it as a carbonate of lime, carrying down all suspended matter in the water, and leaving it when seen in large masses of a peculiar bluish-green colour. A disadvantage of the process was that the deposition of carbonate of lime was somewhat slow,—an improvement was the Porter-Clark process, in which the precipitation is effected by lime in filtering the water. The proper supply of water in towns should be from 30 to 35 gallons per head, per day. Prof. Rankine had indeed fixed the latter quantity as a maximum, but he deprecated any set limit; if as much as possible were provided, a use could be found for it. Ancient Rome had a supply of 300 galls. per head daily, brought by three great aqueducts, and although these had been patched and tinkered up by successive Popes, it was still the best supplied of large cities. The further question arose, how a supply should be obtained? The rain was a source giving an exceedingly soft and well aerated, and away from towns a pure supply; if collected in and for rural districts, it was the best supply. In towns, however, the rainfall was so laden with soot, organic matter, and free acids as to be unfit for drinking until purified. In many places shallow wells were almost the only source, but were liable to contamination from cesspools and leaky drains. An economical mode of making these was by means of Norton's Abyssinian pipes, which could be connected together so as to supply a main. Again, springs or small streams could be impounded and brought into towns by conduits—the Roman plan. Incidentally the popular mistake that the Roman engineers did not know the use of the siphon was corrected, Dr. Corfield remarking that at Lyons the water was brought through three deep valleys by a series of leaden siphons. Further, towns might be supplied with water from the rivers passing through them, which rivers had higher up received the sewage of other towns. This sensible and cleanly method of supply was largely adopted in this enlightened nineteenth century. There was a town in England which took its water supply from a stream a mile below the point at which it discharged its own sewage—an example of a "circular system of supply" to be carefully avoided. A stream was said to be capable of self-purification, and that this could be supplemented by purification in the waterworks and houses, but this was mere sophistry. There was no river in England of sufficient length to admit of natural purification, and the danger even existed that purifying processes might be neglected at the place of intake—a peril which had been more than once exemplified in London. He appealed to the common-sense of the audience whether it was not better to use a water above suspicion than that from a river containing sewage, even if the latter were filtered, boiled and even distilled. Another source of supply was artesian wells, sunk to the subterranean reservoirs situated between the clay and impermeable rocks. This water was free from organic matters but normally hard. The Kent Company and part of

the New River Company's supplies were drawn from artesian wells, and were the purest in use in London. This artesian water could be furnished to the whole of London if the inhabitants had only consented to the double system of supply, for drinking and cleansing purposes, as projected a short time since. The great advantages of a constant over an intermittent supply were pointed out in cleanliness, freshness, coolness and readiness to hand; under the present intermittent system cisterns were, however, indispensable in London households. These were often made of lead, an excellent material for the purpose, but expensive. The dangers of lead for water conveyance had been enormously exaggerated; after a short time the lead was coated with an insoluble compound, and then only very soft or pure waters could act upon the metal. Slate cisterns were expensive and usually leaked after a time, when the plumber was called in and caulked the joints with red lead,—quite as poisonous as lead itself. For use on the ground-floor, where weight was no consideration, glazed stoneware cisterns were useful and cleanly. Galvanised iron was another useful and less ponderous material, upon which water had no action. Proceeding to consider water pipes, a curious specimen was shown of a lead pipe which had been recently taken up from the chalk near London, in which the metal had been eaten away by external moisture acting on the chalk. Lead pipes were sometimes lined with tin; but the remedy was worse than the disease, for water acted much more quickly on lead if another metal were present, as galvanic action was set up, and any crack in the tin lining was speedily a source of prejudicial decomposition of the metals. Varnishes for the interiors of mains were best avoided; many were useless and some mischievous, for one of these coatings contained arsenic. In conclusion, the lecturer showed the action of ball-cocks in regulating the supply of water to a cistern, the modes in which they work, and several recent improvements. In the next lecture the subject of Filtration will be taken up, and also that of the Removal of Refuse Matters by Dry Processes.

OUR COMMONPLACE COLUMN. GALLERY.

THE term may be applied to a corridor-like space or room, or, more technically, the floor of a building supported by columns, as the gallery of a church, chapel, or public hall. A gallery in a building for public speaking or in a theatre should be arranged so that the floor shall be sloped at such an angle that the occupants of seats in the back-row may see over those immediately in front. The appearance of columns immediately below the front of a gallery always has an unpleasant effect, and it is better to project the front over the line of support by cantilevers or coves. Many interesting samples of galleries may be found in the churches of Wren, and in the old Elizabethan halls. (See article on "Galleries" in the BUILDING NEWS and illustrations). For picture-galleries we refer the reader to those of the National Gallery, Royal Academy, the Grosvenor Gallery, &c., the chief point being the proportion of the cross section of the apartment, so that the rays of light may produce the greatest illuminating power on the side walls without unpleasant reflection.

"J. A." sends the following note:—Strictly speaking architecturally, a room may not be called a gallery except when its length is three times its width. A gallery whose dimension in length is considerable, will bear to be somewhat loftier than one whose dimensions are more curtailed in the length; but the height must not give the appearance of narrowness, and so resemble a mere corridor. "There is hardly anything in the interior of a building which lends itself so readily to architectural effect as a gallery, by giving lengthened perspective and vista. And when the gallery is formed into divisions, many fresh and rich combinations of form are obtainable." There is at Holkham, in Norfolk, a very beautiful gallery for statues formed by two octagons and a centre connected by open arches. The arranging of galleries tier above tier dates from the seventeenth century.

GARGOYLE.

Gargoyle, or gurgyle (from Lat. *gurgulio*, the throat-pipe), a projecting spout placed generally at the angles of a cornice to carry off the water. They were first introduced into England in the thirteenth century. They are usually in the

form of animals, birds, or human beings. Sometimes, however, they are quite plain. Their origin is somewhat doubtful, but they probably arose from the arrant superstition and mysticism of that age. By some they are considered as charms, or petrified sentinels, to guard against the intrusion of demons. Usually they are grotesque and very ugly; sometimes they are realistic. M. Viollet-le-Duc, speaking of them, remarks that gargoyles were introduced in the beginning of the thirteenth century. They may be seen in the cathedral of Laon, 1220. Many of them are masterpieces of Mediaeval sculpture. Towards the end of the thirteenth century gargoyles became more complicated, the human form often superseding the animal. In the church of St. Urbain, Troyes, may be seen a gargoyle in the form of an amply-draped youth holding a ewer. Gargoyles are common in the Ile de France, Champagne, and on the banks of the Lower Loire; they are rare in Burgundy, in the centre and south of France.—C. F. W.

GATE.

The size of gates depends upon the use to which they are put. Generally, 8ft. 6in. to 9ft. is allowed for width. There are various modes of framing, but the main principle to be observed is to throw the weight of gate upon the hanging-post by cross-braces. We have dealt with this subject in previous articles (see volumes of BUILDING NEWS for 1878). It is very necessary that the material, if wood, should be well seasoned, and the framing accurately put together, the tenoned rails being strengthened by iron straps at the angles. The hinging of gates is an important point, and to this subject we refer the reader. Sometimes the opening stiles run on friction bearers, which, for very heavy or wide gates, are necessary.

GEOMETRIC PROPORTION.

This is a method of designing buildings upon certain geometrical figures, such as the triangle, square, &c. It is well known that the Egyptians and Greeks both applied geometrical construction to the proportions of the plans, masses, and elevations of their halls and temples—a subject that has been alluded to by Aristotle, Vitruvius, Leonardo da Vinci, and various other authorities, ancient and modern. Viollet-le-Duc alludes to the proportions of the Egyptian and Greek structures as mainly founded upon a system of triangles; the subject has been largely treated of by the late Mr. Edward Cresy in Gwilt's "Encyclopedia," who divides the façade of a temple into squares, a certain number giving the width, and another the height. The subdivisions of columns, entablature, pediment, &c., are also proportioned upon this method. It is also agreed that certain proportions based upon the equilateral triangle were given by the mediæval architects to their works, and that the widths and heights of their churches were determined in this way. The sections of many of our cathedrals have been found to be determined by this triangle, and its combinations and subdivisions; the *vesica piscis* was a favourite symbolic figure so employed; and the solids and voids were regulated in the same manner. The square and its diagonal were also used in giving the proportions of plans and elevations in many instances. Salisbury Cathedral is based upon the equilateral triangle erected upon the plan. Winchester and York Cathedrals are also proportioned upon the same figure. We may refer to the works of Vitruvius, Cesare Cesariano, Boeckler, Hoffstedt, R. W. Billings's "Attempt to Define Geometric Proportions," a Mr. Kerrieh's paper in the *Archæologia* XIX., Mr. Pennethorne's "Geometric and Optical Principles of Architecture," &c. (See articles in BUILDING NEWS.)

GEOMETRICAL DECORATED.

This term is applied to the period of mediæval architecture in which geometrical forms in window tracery was developed from the previous Early English forms. It is really the transition from that style to the Decorated of the 14th century. Mr. E. Sharpe adopted this term in his nomenclature between the Lancet and Curvilinear, and assigns the period from 1245—1315.

GILDING.

"J. A." sends the following notes:—

Gilding, or the process of overlaying surfaces with gold. *Mechanical gilding*.—This relates to the application of leaf-gold to wood, stucco, and other plastic materials used to imitate wood-

carving. Process.—First, the surface is prepared with a layer of "thin white." This is composed of whiting and hot size. If the gilding is to be burnished, this is followed by a second coating of "thick white," which is made from the same materials as the "thin white." When these two preparations are completed, the whole of the surface is carefully rubbed down, smoothed off, and a coating of gold size is brushed over, after which it is allowed to dry, then levelled again as the leaf-gold is laid upon it. *Operation*.—The gold leaves are in succession dropped from the goldbeater's hook on to a cushion or pad, held in the hand of the workman, and are by the breath, flattened out on the surface, and cut into the required sizes. Thence the pieces are lifted and laid on the work by a sort of comb formed of delicate bristles, and urged close to the levelled surface of the ground by gentle puffs of the breath. When the gilding has reached a certain dryness it is burnished by an agate-burnisher. These portions are called "matt," and the other parts "burnished" gold. In oil gilding there is a slight difference from the above in the preparation of the surface. First, two or three coatings of thin white are applied, this being mixed with a little mellow clay, afterwards two or three coats of plain gelatine size, and last of all the oil-gold size upon which the leaf is laid.

Amalgam, or Water-Gilding.—Process.—In gilding of articles of metal, pure gold is first combined or amalgamated with quicksilver, by boiling the gold in five or six times its weight of quicksilver. The boiling mixture is poured into cold water, by which it loses a great deal of its fluidity, and it is then squeezed through chamois leather. The amalgam is now the consistency of stiff clay, has a greasy and gritty feel, and is in the most convenient state for being weighed out into the portions requisite for each respective quantity of work. The articles to be gilded are placed in a sort of "cage"; this cage is made in a cylindrical form, and is generally about 18in. in length, by 9 or 10in. in diameter; it is formed of coarse iron-wire gauze, supported by an external framework of iron, furnished with a solid iron door at one extremity. The articles under process having been placed in the "cage," the door is securely fastened; it is then suspended by its axle on two supports in an iron cylinder. The cylinder being previously heated by a coal fire beneath it to such a degree as to be red-hot over a large proportion of its exterior surface, the cage is introduced, and the doors of the cylinder closed. The hinder part of the cylinder is connected with a chamber and flue, so constructed as to carry off the deleterious fumes of the mercury. Steel and iron are gilt by being immersed in a mixture of nitro-muriate of gold with sulphur in ether or alcohol. By combining these liquids together, an alcoholic solution of gold is formed, from which the metal is precipitated by the iron or steel. Ivory or bone may be gilt by immersing it first in a solution of sulphate of iron, and afterwards in nitro-muriate of gold.

Encaustic Gilding.—This distinction is applied to the coating with gold porcelain or glass. Porcelain is gilt by the application of gold leaf during the process of manufacture, and fixed by that intense heat which confers upon this substance its enamel and glaze. Glass may be gilt by applying leaf-gold to the glass when wetted with a solution of isinglass.—J. A.

Two windows, designed and executed by Messrs. Powell and Sons, Temple-street, City, have been inserted in the chancel of St. Michael's Church, Lewes. The one at the north side represents St. Longinus the Centurion, who was present at the Crucifixion; and that on the south side, St. Michael having conquered the Devil, who lies at his feet in human form. The windows are to be considered as an extension of of the eastern one, on which is represented the Crucifixion.

The Dublin Central Tramways were officially inspected by Major-General Hutchinson, R.E., on behalf of the Board of Trade, on Saturday, and were authorised to be opened for traffic. The lines extend from Dame-street to Clonskeagh, and from Camden-street along the South Circular-road to Clanbrassil-street. Mr. R. W. Walsh was the engineer, and Mr. W. M. Murphy the contractor.

Everyone will be glad to hear that Mr. J. L. Pearson has been appointed to the office of architect and surveyor of the fabric of Westminster Abbey, vacated by the lamented death of Sir Gilbert Scott. The special works already commenced by Sir Gilbert Scott will be continued by his son, Mr. John Oldrid Scott.

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ILLUSTRATIONS.

PRIZE DESIGN FOR A SCHOOL OF ART.—DAIRY FARM PLANS.—
HADDON HALL, PART OF NORTH FRONT.—NEW HOUSE AT
EASTBOURNE.—NEW PREMISES OF THE ART UNION OF
LONDON.

OUR LITHOGRAPHIC ILLUSTRATIONS.

DESIGN FOR SCHOOL OF ART AND SCIENCE
BUILDINGS.

THE above design was sent in for the National Competition at South Kensington of last year, and was awarded a bronze medal. The subject was chosen in preference to others as being one more calculated to bring out the abilities of students. It will be seen upon reference to the plan that the building is divided into two wings or departments. The left-hand wing is wholly devoted to the requirements of a good-sized school of art, and includes all the rooms necessary for the various branches of art training. A head master's room, with studio, is provided, together with second master's, secretary's, and committee rooms, and an attendant's house. Staircases for the respective departments flank the south-east and south-west angles of the building. The front is supposed to face the south, and there being few class-rooms on that front, the greater part of light obtained would be from the north, east, and west, a south light being considered objectionable. The large lecture hall forms a central feature, and is emphasized externally. This hall would be common to both departments, and its dimensions show that it would serve for concerts, lectures, &c., it having separate access, and being somewhat disconnected from the busier parts of the schools. The right wing consists of a series of class-rooms, lecture-rooms, and laboratories, which make it suitable for scientific purposes. The plans themselves will fully explain the further details of the buildings. Externally, that treatment has been aimed at which would give most light and air together with a simple architectural effect. The materials proposed are white brick with stone dressings, the internal woodwork pitch pine or oak, the glazing generally plate glass, but of the large hall cathedral tinted in lead lights, and the roofs to be covered with Staffordshire tiles. The design is by Arthur Marshall, a student of the Nottingham School of Art, of which school Mr. J. S. Hawle, F.S.A., is the head master, and it was criticised in the BUILDING NEWS at the time the national competition drawings were on exhibition at South Kensington.

DAIRY FARM BUILDINGS.

THE principal object in this design being to obtain the most suitable position and best aspect for cow-house and covered cow-yard, with an economical arrangement for the preparation and supply of food; the former building is made to occupy nearly the whole of the south front. The covered yard in connection therewith and measuring 72 by 64 feet is sheltered on the west and east sides by other buildings. The roof of this yard is proposed to be constructed with wrought-iron principals of one span, covered with galvanised corrugated iron, by which means a flat pitch, but light and durable covering, is

obtained, and the danger from choked and overflowing flat gutters are to a great extent avoided, while greater facilities are given for the movement of cattle and the carting of manure, through the avoidance of intermediate roof supports. In actual practice a roof similar to the one shown, and for the same purpose, has been found to cost less than if constructed in the usual method of two or more spans. The shed centrally placed at right angles to the cow-house admits of cattle food being prepared and conveyed for use by tram truck with the least possible amount of labour. The steaming apparatus is placed in close proximity to the chaff-bin and root-cutter, and the meal boiler for piggeries convenient to the meal bins. The chaff-cutter would be placed on upper floor over the chaff-bins, the corn mill over meal bins and adjacent to granary, and the root-cutter on bottom floor, driven by a counter-shaft from the main shaft above. Piggeries facing south have covered courts and open yard; waggon and implement sheds are placed north and shelter the open yards. Straw for litter would be deposited in straw loft by an elevator, and from thence pitched through doorway into covered yard as required. A fixed engine and Cornish boiler are proposed to be used for driving the machines, and the shafting would be on upper floor.

HADDON HALL.—THE NORTH FRONT.

It would not be fitting to attempt a description of Haddon in a paragraph of the sketch. I may say that it was made on a frosty morning in January, and represents principally the exterior breaking up of the kitchen chimney.—W. R. LETHBRAY.—Amongst the sketches of details from Haddon Hall, which have been illustrated in the BUILDING NEWS, are the Woodwork, April 2nd and 16th, 1875 (Vol. XXVIII., pp. 372, 428); Chapel Seating, February 18th, 1878 (Vol. XXXIV., p. 158); and the Leadwork, August 30th, 1878 (Vol. XXXV., p. 210).

NEW HOUSE AT EASTBOURNE.

THIS very interesting little bit of domestic architecture was exhibited, by the view we publish to-day, at last year's Royal Academy Exhibition. The several details also included in our illustrations will at once explain themselves. Red brick and tiles were used for the walls and roofs, with cut and carved brickwork to the entrance. Mr. R. W. Edis, F.S.A., is the architect.

ART UNION FOR LONDON—NEW PREMISES, 112,
STRAND.

LAST week were published a general drawing, with plans and description, of this new building now in course of erection, from the designs of Professor E. M. Barry, R.A., architect. To-day we give a sheet of details of the upper part of the principal facade which faces the Strand. Next week we hope to publish some further details, illustrative of the first or chief floor of the building.

VENTILATION OF ROOMS, HOUSE-
DRAINS, &c.

MR. P. HINCKES BIRD, F.R.C.S., &c., late medical officer of health to the Fylde Combined Sanitary Authority, has just published a small work on this subject. We have already spoken of Mr. Bird's plan of window ventilation, viz., having a space for entrance of air at the meeting rails and raising the lower sash, blocking up the opening left. The author enters minutely into the subject of room ventilation, and recommends architects and builders to make the bottom beading of windows 2in. to 3in. deep, so as to insure an opening between the meeting rails. The author proposes for an outlet an opening into the kitchen chimney flue under the cornice, and, as far as we can see, practically adopts the Arnett valve, which he condemns as noisy. Messrs. Doulton and Co.'s smoke and air flues are recommended. We are inclined to think an opening 12in. by 6in. is unnecessarily large. A long disquisition on house-drain ventilation followed, in which the author has strung together a number of quotations from sanitary writers, all of which are more or less to the point. Mr. Norman Shaw's open soil-pipe is as usual pooh-poohed, the objections made to it being chiefly those raised in our own pages by correspondents, to which we need not refer here. The author does not appear to know of a similar principle advocated in our pages, but without the liability of the open pipe being choked up; but the objec-

tion urged to open soil-pipes has not been found to exist; in cases we know, in fact, they are more imaginary than real. We quite agree with the other advice of Mr. Bird, that all waste-pipes should discharge outside, and can speak favourably of the form of closet illustrated. This chapter is finished by reference to the model by-laws issued by the Local Government Board, which are quoted in full. The work concludes by a long chapter on the ventilation of sewers, in which the opinions of Dr. F. Letheby, Sir Joseph Bazalgette, Mr. Latham, Mr. Rawlinson, Mr. Ellice-Clarke, and others, are given, and the author adopts the only common-sense view that the freer the escape of air from them the less injurious they will be to health.

BUILDERS' CLERKS' BENEVOLENT
INSTITUTION.

THE twelfth annual general meeting of this institution was held at the offices, 27, Farringdon-street, E.C., on the 25th February, Mr. T. F. Rider, President, in the chair. There were also present, Mr. George Plucknett, Mr. Thomas Robinson, Mr. E. Graystone, Mr. E. Brooks, Mr. J. A. Robson, &c.

The report showed an income for the past year of £297 17s. 11d., and included some liberal donations from the President, the Builders' Society, Mr. E. S. Rider, Mr. Charles Kynoch, and Mr. Edwin Laurence. One additional pensioner, Mrs. Hannah Wade, had been elected, and a second presentation to the Orphan Working School had been purchased, Ethel Mary Jeffreys having been elected to enjoy the benefits afforded by this excellent school. During the year the pensions had been increased to £25 per annum to men, and £20 per annum to widows, and the report concluded with the hope that more of the builders' clerks would become subscribers.

Mr. Rider, in moving the adoption of the report, after referring feelingly to Mr. Colls's death, and to the severe illness of Mr. T. F. Cooke, one of the original promoters of the institution, he said that the year 1878 had certainly been a wretched year. Strikes, war, badness of trade, and calamities, had characterised it, yet, amidst it all, he was happy to say that the institution had held its own, and good work had been done. An additional pensioner had been elected, and another presentation to the Orphan Working School, to which a child had been elected, had been purchased. Again, looking to the balance-sheet, he observed that while the income for 1877 was £292 7s. 10d., that for 1878 was £297 17s. 11d., showing a balance in favour of the latter year. Again, an alteration had been made in the rules, by which the pensions had been increased, and with regard to this latter point he could assure the meeting that the news had been received without any grumbling on the part of the pensioners.

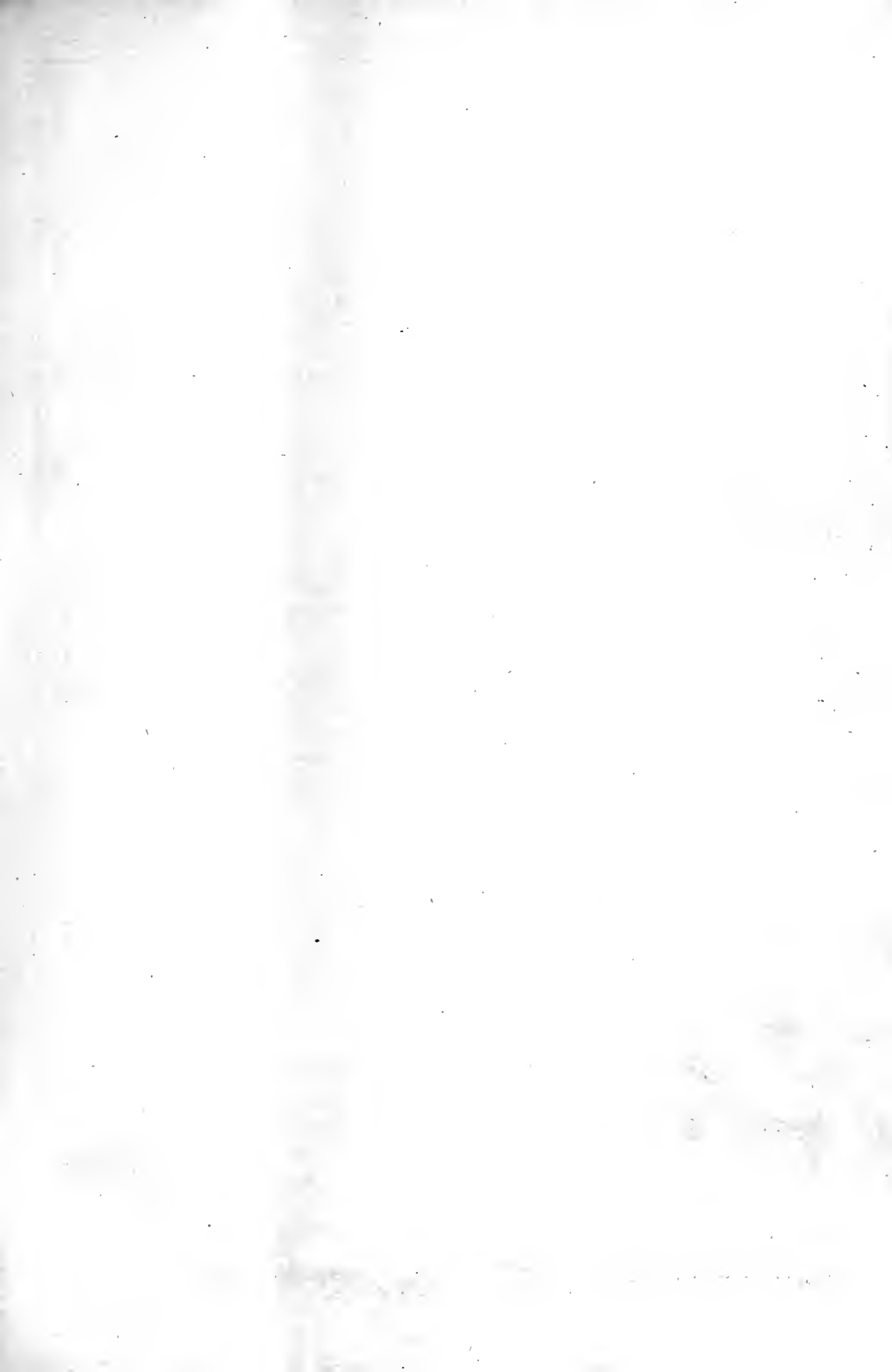
Then, referring to the subscribers, he said he should certainly like to see a greater number of builders' clerks on the list than was the case, and it had occurred to him that if a dinner were held, which he hoped would bring together a good number of clerks, and if they could get gentlemen like Mr. Plucknett, Mr. Robinson, and Mr. Conder to come and encourage them by their presence, he thought it might be a means of making known the benefits offered, and generally be a means of benefitting the institution.

The ordinary business of the meeting was then attended to, and on the motion of Mr. Plucknett, seconded by Mr. Robinson, a vote of thanks was accorded to the chairman, and the proceedings closed.

The Free Library, Bradford, and also the Liberal Club, have been fitted with Messrs. Robt. Boyle & Son's Patent Self-acting Air Pump Ventilators, and we understand the ventilation is pronounced to be most satisfactory.

Mr. Leader Williams, engineer to the Severn Commissioners, died on Wednesday week at his residence at Worcester. He was in his 77th year, and had held his office since 1842, when the Commissioners were established. One of his sons is Mr. Benjamin Leader Williams, the well-known artist; another is engineer of the Bridgewater Canal; and a third is engineer of the harbour of Sydney, New South Wales.

The electric light is being employed nightly upon the Severn Bridge, in directing work during low-water, under the management of Mr. Scholes, the contractor's foreman. It is reported to be a success.



New House at EASTBOVRNE

Robert W. Edis F.S.A.
ARCHITECT

Entrance
and
Window over

Plan through
Window

Floor

Hall

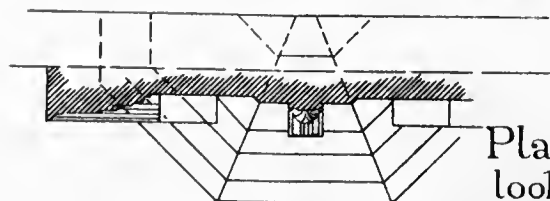
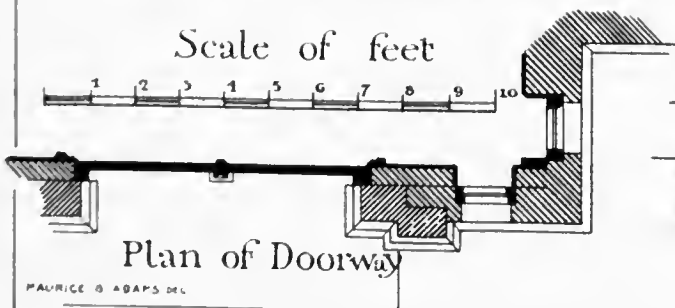
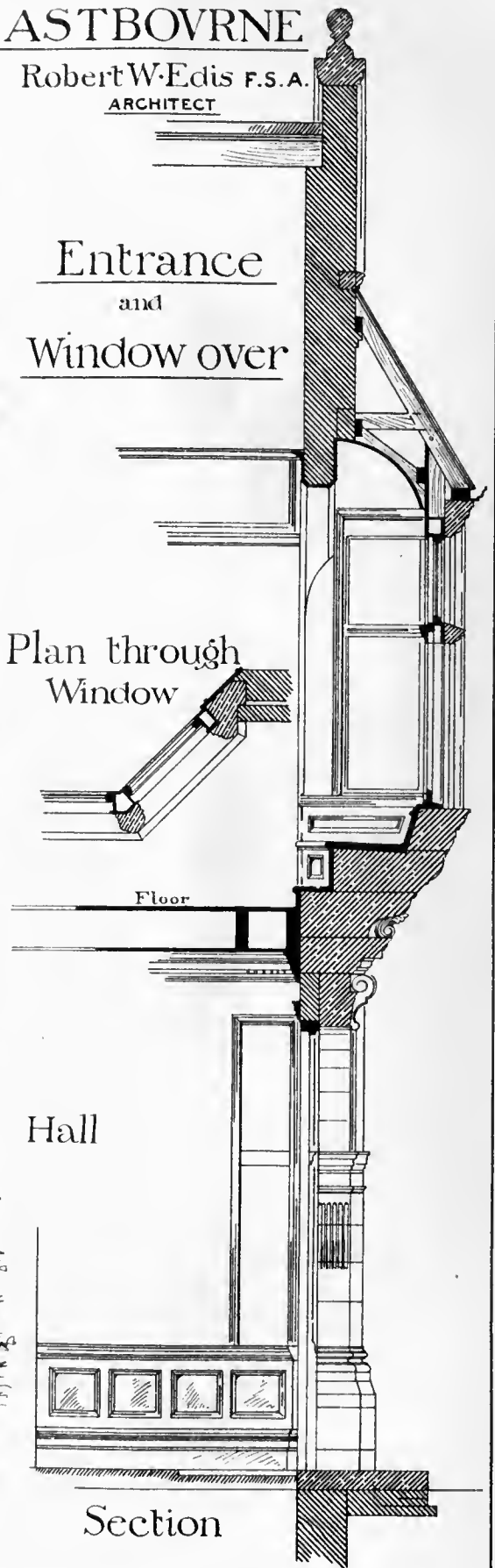
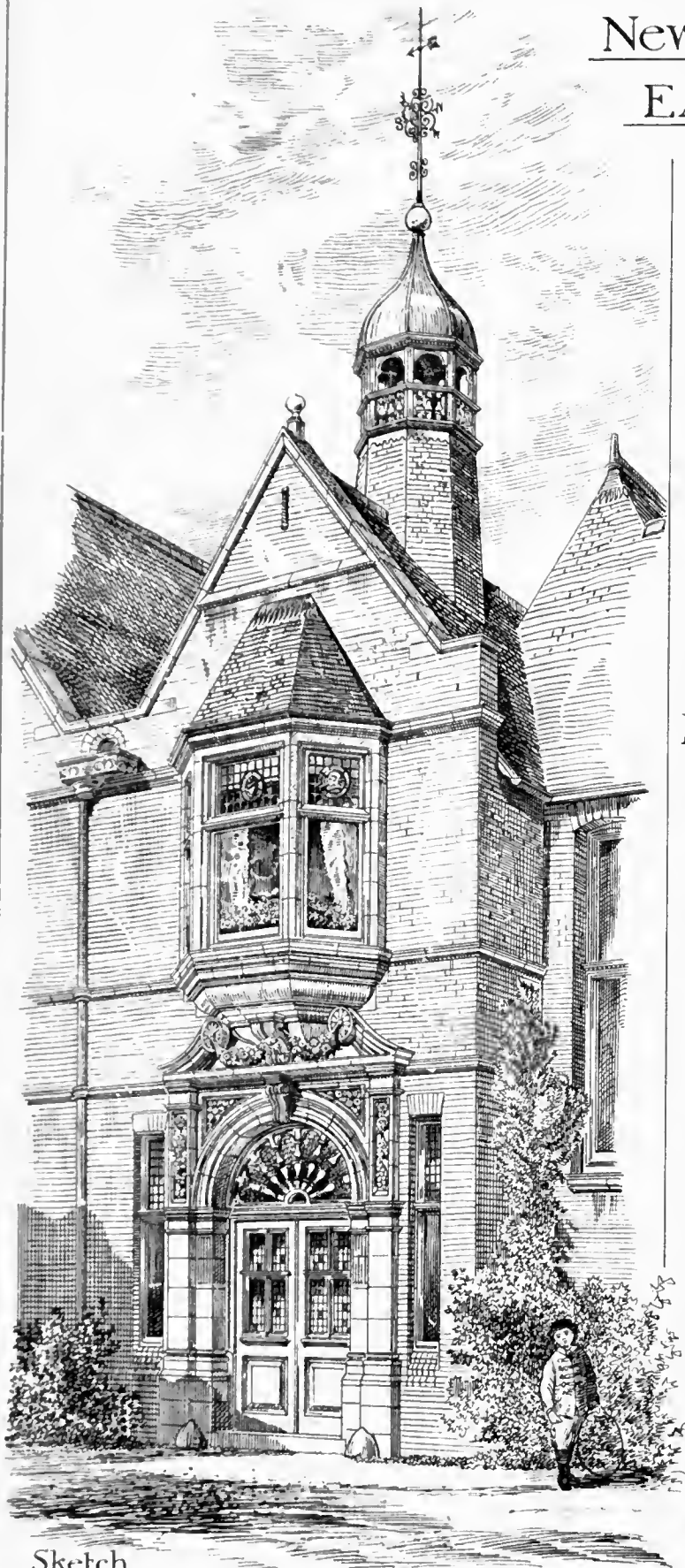
Section

Sketch

Scale of feet

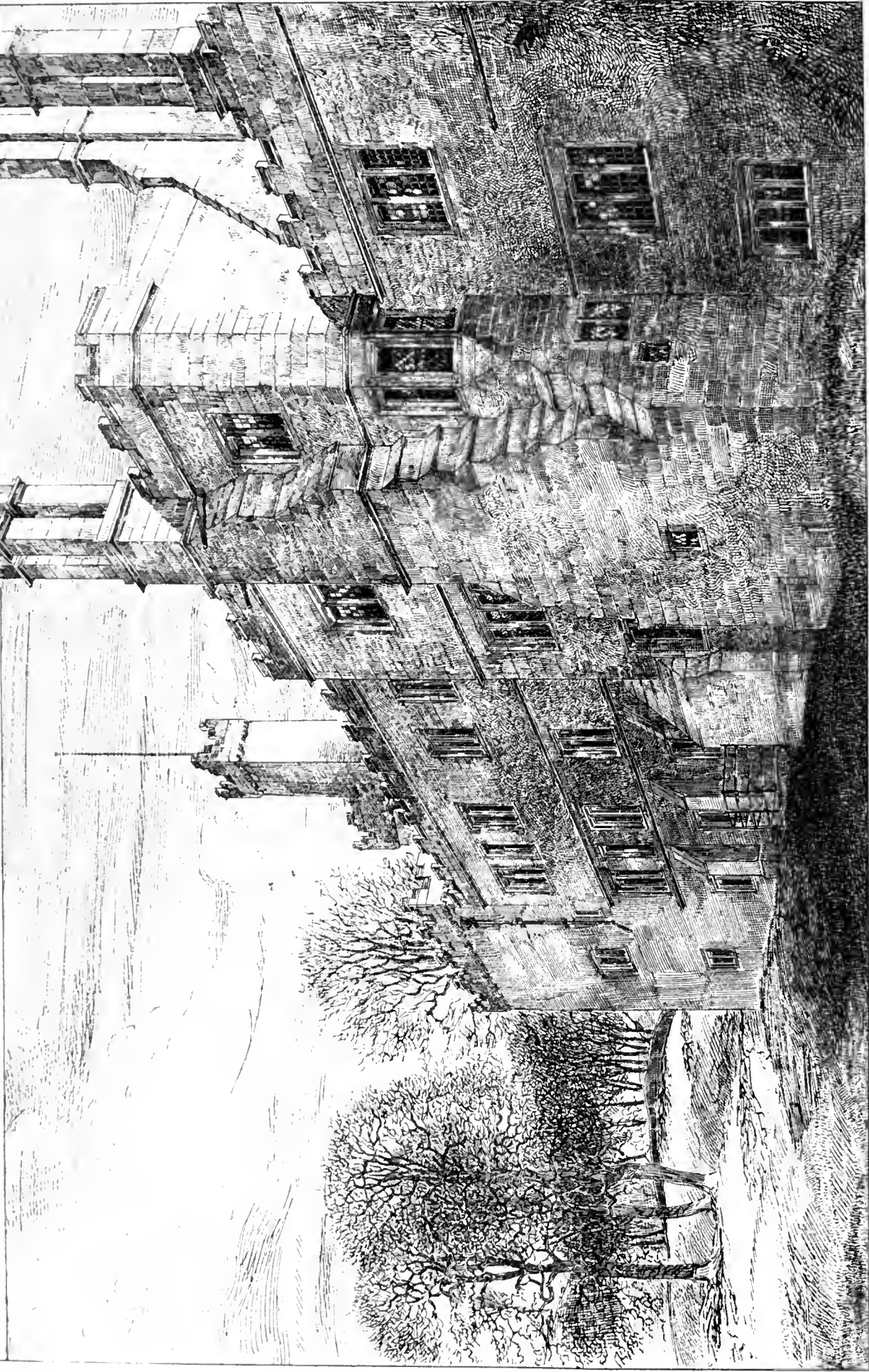
Plan of Doorway

Plan at A
looking up



THE BUILDING DEWS, MAR 7, 1879.

HADDON HALL Derbyshire: Part of North Front



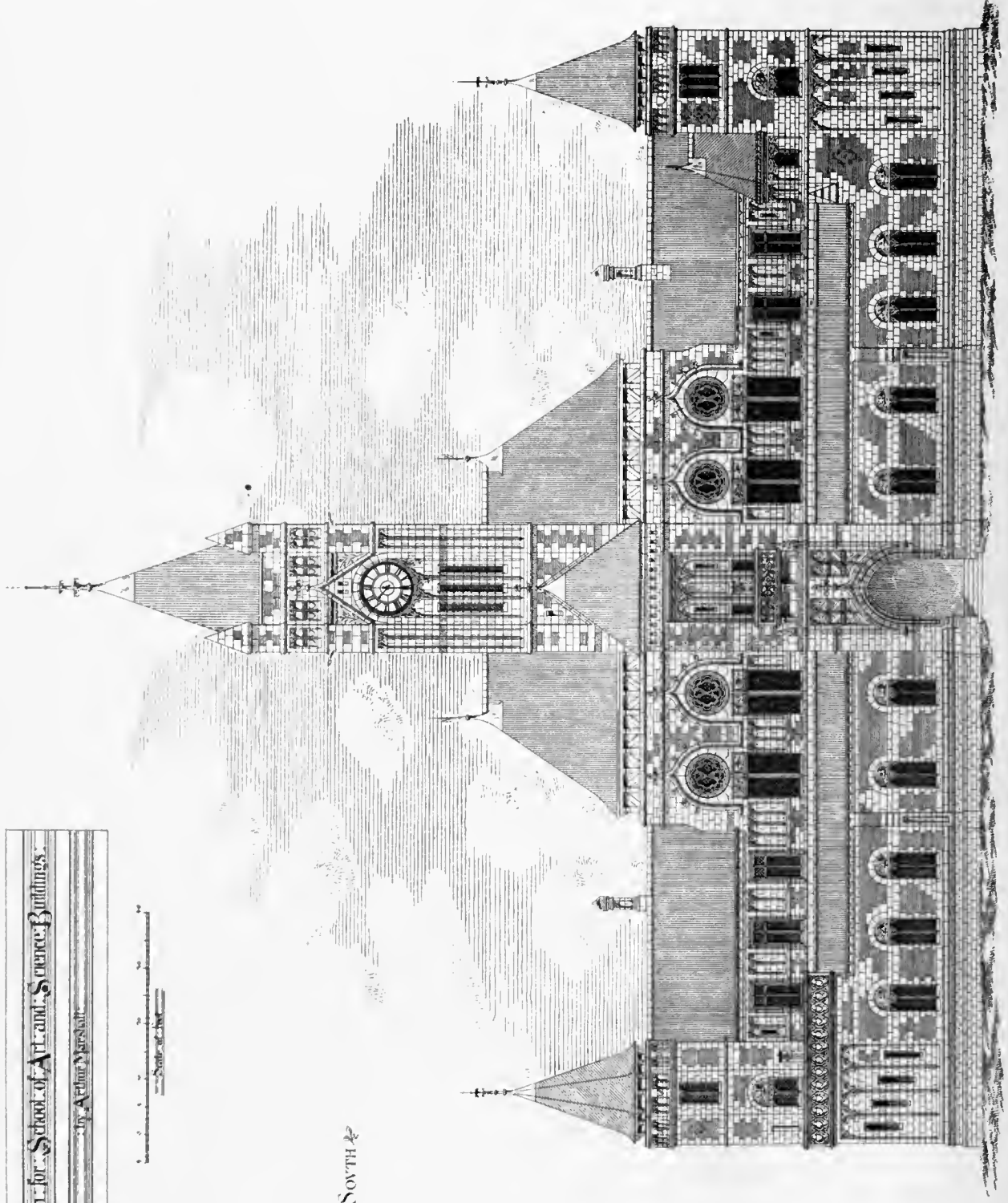
THE BUILDING DEWS, MAR 7. 1879.

Design for School of Art and Science Buildings.

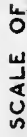
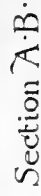
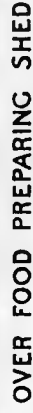
By Arthur Marshall.

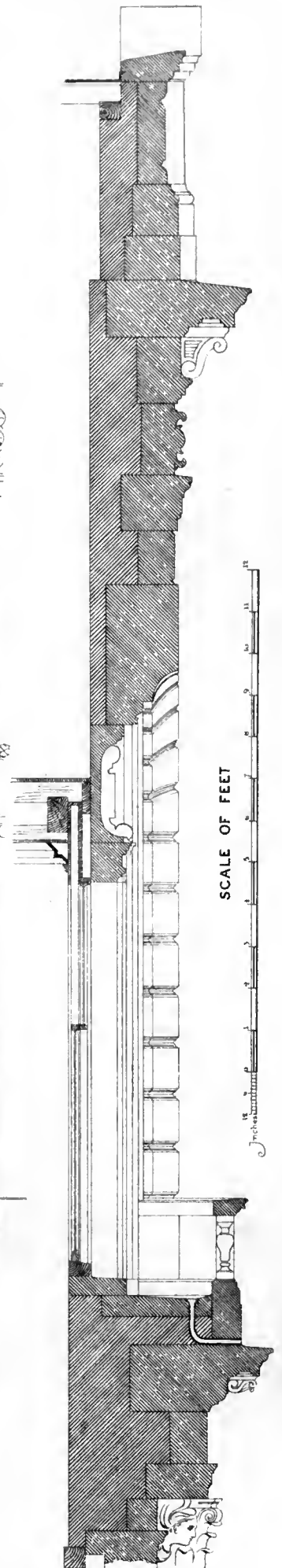
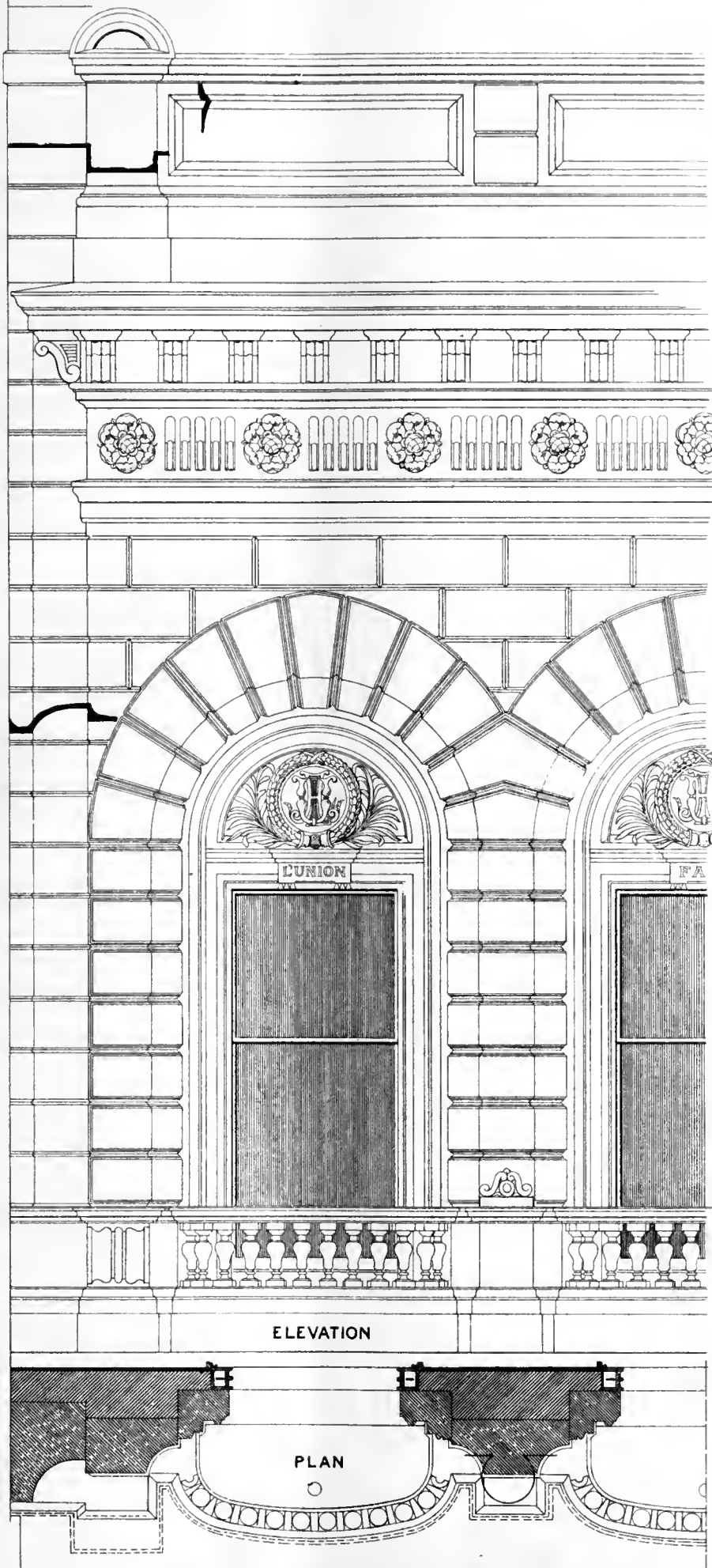


SOUTH



THE BUILDING NEWS, MAR. 7. 1879.

THOS: POTTER
ARCHITECT



ART-UNION FOR LONDON NEW PREMISES 112 STRAND W.C.
 DETAILS OF UPPER PART OF FRONT PROF. E. M. BARRY R.A. ARCHITECT

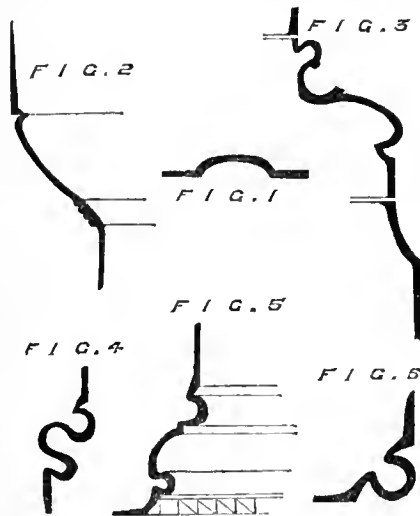
ARCHITECTURAL ASSOCIATION.

At the fortnightly meeting on Friday, the President, Mr. H. L. Florence, in the chair, the following gentlemen were elected as members—J. J. Gaul, J. J. Jones, A. J. Wood, J. R. Duckworth, E. E. May, and H. B. Taylor. It was announced that the next visit would take place on Saturday afternoon, March 8, and would be paid to Mr. J. Oldrid Scott's Greek Church at Bayswater, and to the new Jewish Synagogue near by. The President referred to the death of Mr. Charles J. Adams, of Stockton-on-Tees, who for several years acted as hon. secretary of the Association.

STUDIOS AND MOULDINGS.

Mr. EDWARD W. GODWIN, F.S.A., who had been announced to read a paper upon "Trim-mings," was then invited by the President to address the meeting. He said: Gentlemen, I stand here in a very awkward predicament. I have lost my lecture! (Great laughter). Where, I have not the slightest conception. Up to ten o'clock last night it was safe and written, and between that hour and ten this morning it disappeared. That the lecture was absolutely written I give you my word of honour; your secretary saw part of it, and one of my friends read the peroration. This morning I saw your secretary, and said "I shall back out of it. I have written my lecture as promised, and now it's gone there's an end of it." But Mr. Page said, "No, you are the thing we want, and not the lecture." So as I believe in the Architectural Association immensely, here I am. Well, I am here simply to talk to you about a few studios—I see five sets of my drawings on the walls—that I have lately built. I shall divide my sermon into three heads (I am quite orthodox and regular, you see). 1st, Studios detached; 2nd, Studios in groups; and 3rd, Studios in houses. The architect, like the tailor, should cut his coat according to his cloth: now there are hardworking young artists who have their pictures returned again and again, but who yet want studios built for them—places which shall not display any rare architectural talent. What is wanted is cleverness in designing something cheaper than the builder could manage by himself. At the back of most London gardens there is space for such studios. Thus in the neighbourhood of Gower-street there are stables, which let at from £20 to £30 a year. If the walls on the north side were raised, the south left low, and a lean-to roof or lid from the high to the low wall, with high lights, a working room could be constructed which would cost very little and would easily let to painters at quite £40 or £50 a year. Nothing could be more simple, and nothing more effective. Competition with the builder on his own ground of cheapness is not a bad thing. I tried this some time since at Kensington Palace for the Princess Louise, for whom a builder had volunteered to put up a studio for about £800. The Princess Louise thought this was rather too much for a simple building at the bottom of the garden, and a friend advised her to "go to Mr. Godwin." I built a studio 17ft. high and put over it a kind of Mansard roof, with windows looking into the garden. It is about 25ft. square and has an ante-room attached for the Marquis of Lorne, a little hall, and three entrances. The walls are of red brick, there are green slates on the roof to match the old house, and few would notice that anything had been added to the old building. It is quite as pretty as the builder's would have been. It is admirably suited for a studio, and we managed to put it up for between £600 and £700, including architect's fees. All the light is reflected so as to reduce the horizontal ceiling as much as possible. This studio seems perfectly satisfactory to the Princess, to Mr. Boehm, the sculptor (for it is a sculptor's studio), and also to myself. Now as to lighting a studio, I use a so-called Mansard roof and keep it as steep as I possibly can. The artist is the most extraordinary client that you can deal with—every individual painter has his individual idea as to what a studio should be. One tells me that he wants the light to come straight down from the roof, and another says he must only have a window light, while Pellegrini declares he will have nothing but light—walls and roofs, all must give light. One would be driven mad if he had many painters as clients. Mr. Albert Moore has acted upon the principle of endeavouring to get rid of every right angle, and to reflect as much light as possible.

He has designed his own building—I presume at a much greater cost than if an architect had been called in. The walls and ceilings of this studio are cut about in a most remarkable manner, so that when you go in you think you've got inside one of those many-sided figures used for mathematical demonstrations of angles and prisms. It has, indeed, numerous sides, is very dodgy and well worthy of consideration by every artist. Detached studios may always be built for about £600 or £700 a-piece, and for much less if old walls can be utilised for part of the substructure. Studios thus arranged would be a vast benefit to young painters, most of whom live and work in little rooms of a very inferior character. Frith painted the "Derby Day" in a room which still exists over a French restaurant in Charlotte-street. Whether it would have been a better work had it been executed in a properly-constructed studio I am not prepared to say, but I hope so. Mr. Hamilton Macallum says, "I should like to be in a conservatory when I paint, so as to get plenty of light all round." I fear that if it were anything like the palm-house at Kew he would be half his time trying to shut out and adjust the light. On the wall are a series of



plans and designs relating to a house I have carried out for my old friend Mr. Whistler (applause). He used to paint in one of those ordinary 1st floor rooms looking on the British Museum. Whistler moved to Chelsea, to a very different house in Cheyne Walk, built by Sir Christopher Wren; a small studio with black oak panelling, and looking nearly west with a light somewhat vague and foggy—just the terms in which the Attorney-General was pleased to describe his pictures the other day. I thought he was working under studio disadvantages, and on my suggestion he took two plots of ground in Tite-street, which at the back looked north-east over Chelsea Hospital grounds. My design showed two studios, one 48 feet by 30 feet, the other 30 feet by 20 feet, etching-room, dining-room, breakfast-room, and bedrooms, and was to be built in white bricks and covered with green slates for £1,700. The Metropolitan Board of Works, having let us proceed, at last objected to the design. Of what they said about it in council assembled, things were repeated to me which were positively shocking to one's morality. (Laughter.) They specially objected, I found, to my roof, which was at two different angles. I made a perspective with the utmost care, and I assure you I didn't fudge it one atom, showing that the upper part of the roof sloped at such an angle that the part they objected to would not be visible from the street. They replied that they did not judge by perspective, but by elevation. Could you have believed that any body of men could display such crass ignorance as to think that a building would look, when carried out, like the elevation? There are on wall two designs for Mr. Frank Miles's studio in Tite-street—a most unfortunate name, by the way. It is for a bachelor, is unpretentious, containing about nine rooms, besides studio. The latter is at the top of the house, and is in length the width of two plots—about 40ft. The roof is very steep at base, and then falls off, light being got at the steep slope. The whole house was designed with balconies and other accessories to meet the tastes of a lover of flowers. When the

first elevation was sent to the Board of Works, our respected friend, Mr. Vulliamy, said, "Why, this is worse than Whistler's," that it would be useless to lay it before the Board, and that it would not do, and yet I consider it the best thing I ever did. I grant you there are no cornice, no parapet, and no string-course; but is architecture a matter of string-courses and parapets, and of following out to the letter every detail to which the provisions of the Building Act apply? Because I chose to do something different to the conventional, because I was not in the fashion, and because the Board and its offices knew nothing by experience of the nature of my work, the Board refused to let my design be carried out. Well, I made a second design, as you see, in which I introduced a number of reminiscences of a visit to Holland, and the thing was pronounced charming. This is very sad. I am bold enough to say I am a better judge than the Board of Works as to what is right in architecture. There is no chance for art and originality when such things as that go on at Spring-gardens. It is a disgrace to the whole profession that Spring-gardens exists as it does. And who are they who dare to sit in judgment on my work? What "judgment" have retired furriers and cheesemongers, who never drew a line nor saw a drawing till yesterday? Well, here is another set of drawings of a double house designed for Signor Pellegrini and Mr. Stuart Wortley. In the elevation on the wall that I have submitted to the Board of Works, by talking in a language they have heard of, you will see the house is a double one, with balcony from one studio to the other, and various means of communication, all of which, should it be necessary, can be shut off. Now let me diverge. It has been recently said in this room that there is a certain class of mouldings well suited for use in Greece, and another class that are eminently adapted for England; and the difference between the one and the other has been solemnly illustrated by a gentleman whose attainments are no doubt very great. Now, the class of mouldings which are said to be adapted for Athens, and not for this country, are those we see in the British Museum and in Stuart and Revett; they consist of very fine curves, hardly going beyond a straight line, with a slight turn at the ends, as you see on the blackboard (Fig. 1). In this (Fig. 2) is another Greek moulding, like to the edge of the salvia leaf. These mouldings are of a subtle and delicate character, not to be copied by the use of instruments. Some of these delicate curves I have endeavoured to introduce into my designs, such as this (Fig. 3), and I fail to see that they are not as suitable to England as to Greece. It has been said that our mouldings are bold or coarse because of our foggy climate; but on a wet day one doesn't care whether a moulding has been used or not. I never look at a moulding on a foggy day. When we talk about architecture as a fine art we mean refinement, finesse, gentleness; and these qualities we can always trace in Greek mouldings. At Whistler's house there is an entrance doorway in Portland stone, in which I have endeavoured to express these ideas; you will, it is true, find nothing forceful or bold about them. I do not speak without some knowledge of English mouldings. I have spent hours examining them, with Professor Willis; I have drawn them, measured them, felt round them—when we knew all the time just what we find in them. Here's a typical Gothic moulding (Fig. 4). You may laugh, for there is next to nothing in it. Here (Fig. 5) is a moulding I have used. Had I been a few years younger I should have cut off the lowest member, and notched it. And here (Fig. 6) is a favourite moulding of Mr. Burges's. Most of us understand all about these, but we shall not know all the subtlety that makes the beauty of a Greek moulding till the end of our lives. They are not curves which can be struck with a pair of compasses. The best work of the thirteenth century no doubt approximates in feeling to Greek art. This I have seen in France, and especially at Lisieux some years since. I will conclude by expressing the opinion that earnest studies of the best Gothic work of the thirteenth century will lead us, step by step, back to Greek work. Out of an examination of the principles of working in the best examples of those periods may be evolved in the future something that will

* Mr. Godwin's detail drawings of the apse of Lisieux Cathedral, exhibiting some of these subtle curves, were reproduced in the BUILDING NEWS of Oct. 2nd, 1874.

be more worthy our attention, more refined and finished than either Gothic or Queen Anne. You have seen the church near St. Pancras Station, a copy of a Greek temple. That is not the form in which Greek art is to be revived. The study of the Parthenon will not be much good to you; but in the details of other buildings on the Acropolis, in the Greek colonies, and in the many reliefs and fragments at the British Museum. In these and other examples you will see a refinement and grace which will well repay study, and may be the foundation of the architecture of the future.

Mr. STANNIS proposed a vote of thanks to Mr. Godwin for having said so much of interest in so diffuse a manner. The candid self-criticism with which he had interspersed his descriptions was valuable. The loss of the manuscript might be a source of regret to Mr. Godwin, but they could scarcely sympathise with him, for they had had an address probably quite as instructive, and certainly more amusing, than the lost lecture.

Mr. GILBERT REDGRAVE, in seconding the motion, observed that for some months past Mr. Godwin had excited their curiosity by the wide title of his paper. Since that lecture was irrevocably gone, would he gratify the members by telling them what "Trimnings" were? From the address he had learned that no artist could hope to become great unless he had a studio built for him at the proper time. The "cheap" studio seemed to be a glorified stable; how should such a place be approached?—by the mews or through the house? He did not understand how far Messrs. Pellegrini and Stuart Wortley's formed one or two houses, nor how the requirements of the Building Act were met. Amongst the contrivances for lighting Mr. Godwin had not mentioned the plan adopted by Mr. Cooper, which was an open frieze, admitting light all round.

Mr. RIDDETT inquired as to the best arrangements for screening and warming studios, and Mr. CLARKSON as to the modes of regulating light.

The vote of thanks having been carried by acclamation, Mr. Godwin replied. For the meaning of "Trimnings" he must refer members to his paper. He would explain that some years ago a lady who had lived in Paris said to him satirically of the dress of English ladies, "They import their fashions from Paris, but they exaggerate the trimmings, and the result is vulgarity. What is there a touch of colour, becomes a blotch in London. What was a delicate bow becomes a draggetailed dustcap." He thought the criticism would apply to English architecture as well as English dress, and hence the title of the paper, which he had illustrated with examples from Norman Shaw, Stevenson, Chancellor, and Gundry. If the massing were bad that might be the fault of the client; but if the trimmings were coarse the blame must rest upon the architect. He had been asked as to the entrances to back studios. These might be anywhere, wherever found convenient. One of our lady artists worked in a studio approached by a step ladder—he referred to Miss Wortley. The double house he had referred to was really one with communications on every floor, but they could be separated with the greatest ease. He regarded a studio as at once a workshop, a reception-room, and an exhibition building, and designed it accordingly. For heating he had tried two plans; an open fireplace at one end and an American sun stove or German stove at the other. He preferred the latter form of stove, as it was less drying and retained the heat a long while. As to blinds, tastes differed. Mr. Whistler had white blinds, admirably hung so as to allow no light to come through cracks. Another artist used dark green opaque blinds of some felting substance. He believed Mr. Moore screened his light by hoods over the windows and skylights, and by movable shutters. His own opinion was that when a studio was properly and not over-lighted, no blinds were needed, and that an adjustable shutter at the bottoms of the windows would meet every requirement.

The Hon. and Rev. B. P. Bouverie, rector of Stanton, St. Quinton, whose skill in sculpture is, the *Wiltshire County Mirror* says, well known, is engaged in carving in white marble a full-length recumbent figure of Bishop Hamilton, to be placed on an altar-tomb to the Bishop's memory in Salisbury Cathedral.

The Melksham local board have appointed Mr. J. Hoskins as surveyor.

ROYAL ACADEMY LECTURES ON ARCHITECTURE.

SECOND PERIOD OF RENAISSANCE—BRAMANTE AND SANSOVINO.

THE period of the rebuilding of St. Peter's at Rome, and of the non-Gothic palaces at Venice, formed the subject of Prof. Barry's fifth lecture to the Academy students. A passing notice was made of a contemporary of Brunelleschi, Leon Batista Alberti, who designed some important buildings in the neo-Roman style, including the church of St. Andrew, at Mantua. This edifice is cruciform in plan, but has a semicircular arched roof and crowning dome; the ornamentation is more suited, however, to a secular building than to a church, and the design has the merit of consistency but not that of fitness. It is to be regretted that the Renaissance was based throughout on Roman ideas, and that the beauties of Greek architecture were till long afterwards a sealed book to the Italians. The direct imitation of Roman buildings with all their faults was common, and was notably the case in the rebuilding of the venerable basilica of St. Peter at Rome, a church erected in the age of Constantine, of magnificent dimensions and having a grand internal effect from its double aisles, and their long vista of columns. The Papal Court, however, decided to replace the old basilica by the greatest and most splendid church the world had ever seen, and when Julius II. was raised to the pontifical chair he found the architect for such a design in Bramante, who was born just as Brunelleschi died, and on whom the mantle of the latter seemed to have fallen. Originally a painter, he turned his attention to architecture, and travelled in North Italy, and studied in Rome, acquiring an accurate knowledge of Roman details which no one had hitherto possessed. It is unfortunate that fuller materials do not exist for estimating his talents; for, even at St. Peter's, very little of Bramante's work remains. He was largely employed by Pope Alexander VI., as well as by Julius II., at the Vatican. The Palace of the Cancelleria was partly designed by him, and is remarkable for refinement of detail. There are in it no signs of that worship of bigness which was to triumph at St. Peter's after Bramante's death, but, on the contrary, the parts are small, and perhaps even over-minute. The introduction of pilasters in the two upper stories, a common expedient of Renaissance architects, is open to criticism. Bramante's works were too hastily constructed, and have consequently been largely replaced. In his designs generally, the exuberance of the Early Renaissance became chastened or controlled by a more severe taste, and luxury of detail gave way to a grandeur of style. When summoned by the Pope to advise on the rebuilding of St. Peter's, Bramante submitted a plan of great size and pretension. The arrangement was that of a Latin cross, with five bays of nave arches, and three tribunes for choir and transepts. A dome marked the intersection of nave and transepts. The principal tribune, which is at the west, instead of the eastern end of the church, was erected before the appointment of Bramante, from the designs of Rossellini, by order of Pope Nicholas V. This tribune was retained by all the other architects who were afterwards engaged upon St. Peter's. In his early travels, Bramante had been much impressed by the cathedral at Milan, and the influence of this leaning is to be traced in the plan for St. Peter's, which resembles a northern cathedral in its division into nave, aisles, choir, and transepts. We are left to conjecture his design for the exterior, for at his death, in 1514, the work had not far advanced. Raffaele and Peruzzi followed him as architects, and passed away in rapid succession, after which the work was intrusted to Antonio San Gallo. Michael Angelo spoke in high praise of Bramante's luminous and comprehensive design, but denounced that of San Gallo on the ground of its multiplicity of features, which he said broke it into too many parts, conveying the idea of a Gothic rather than an Antique or Classic building. In this censure we have a key to the artistic feeling of the time. The period of copying had set in, and every building was to be imitated from the antique remains. The five orders became the rule for the future, and the great difficulty of Renaissance architecture has since been in the right use of columns. If they are too few, and large, they injure the scale of the building, as at St. Peter's; if too numerous and small they produce a pettiness of effect, as in San Gallo's design.

It may be concluded that Bramante would not have raised the dome far above the rest of the building, and beautiful as the present dome of St. Peter's may be, it is to be regretted that Bramante had not the opportunity of carrying out his design. The fault of St. Peter's is its great height in proportion to the width, the dome being two and a half diameters high. The time of Bramante has always been considered the best period of the Renaissance, and so occupied the foremost place among the architects of the new faith. His early training as well as his later convictions led him to appreciate beauty of detail, as well as greatness of conception. Although full of Classic feeling, and even prejudices, he yielded but little to the temptation of actual copying, and his designs show an attempt to adapt the style to the requirements of his day, which is the only reasonable justification of a revival. One of the most famous of Bramante's contemporaries was Sansovino, who began palace-building at Venice while Bramante was engaged at Rome in carrying out the Pope's dream of a Christian temple surpassing every ancient or modern building. The Renaissance appears to special advantage in Venice, for Classical precedents were more freely treated there than by other Italian revivalists, and the fusion state lasted longer than it did elsewhere. In the later palaces of Venice Classical details are adopted more extensively and applied less intelligently than in the earlier works, and too many of the façades are more decorated frontispieces. Thus, at the Casa Grimani three orders are employed, but the columns and entablatures seem to be built against the front without forming part of it; the delicacy and finish of the ornaments and the dignity and solidity of the general effect deserve admiration. A better design is the small Palazzo Camerlinghi, near the Rialto, where the pilasters are actual panelled piers, strengthening the wall, and the openings are of Gothic rather than Renaissance proportions. The elevation would gain greatly, however, by a lateral extension. The most important of the Renaissance palaces is the great work of Sansovino, the Library of St. Mark. Placed exactly opposite the Ducal Palace, it challenges a somewhat unequal comparison between the Gothic and the Renaissance. On architectural grounds alone the Library may well hold its own, but the interest men feel in the Ducal Palace is not purely architectural. The effect of the Library, as a whole, is very good. The orders of columns are well proportioned and detailed; and the small window columns in the upper story are skilfully introduced, so as to give scale to the larger order. The proportions of the arches recall Roman precedents, and contrast agreeably with the elongated types used in the Camerlinghi Palace. It is probably owing to the fact that Sansovino was a sculptor as well as an architect, that the profuse ornamentation of the design is due; at the same time the sculpture itself is well designed and executed. The library is certainly one of the best of the Renaissance palaces, although the Roman orders are imitated in it. If that be a defect very few architects of more recent times can afford to throw stones at Sansovino. It may be worth while to consider how far such reproduction of ancient details is of itself an unpardonable defect, and how far it is a special reproach to the Renaissance. Unless we are to have that dream of enthusiasts, an original style, perfect in all its parts, recourse must be had to precedents. We must use the old styles, though we should aim to adapt them to modern use. With the traditional styles, certain details have come to be so intimately associated that the absence of them or their indiscriminate association with other forms, shocks us, like a false quantity in poetry, or a *lapsus lingue* in speech. Any fusion of diverse architectural schools is consequently a task of the greatest difficulty, needing severe restraint, great caution, and abundant knowledge. The architectural student requires to be on his guard in this respect. Too often he is tempted to believe that an indiscriminate hotch-potch of past features is to be the style of the future. Such a mis-use of freedom merits the name of "carelessness," and not that which it claims of "originality." The Renaissance architects have been much censured for the regularity of their designs, but in a compound art like architecture, which demands scientific treatment, the presumption must be, said the lecturer, in favour of regularity in buildings of importance. Although a skilful architect will decline to be

controlled by an absolute symmetrical law, he will remember that symmetry appeals to a natural instinct, and that good reason should exist, if it is to be disregarded in his designs. While the young architectural student ought to study the various forms his art has assumed in the past, he need not copy all he sees. Let him choose his own line and attach himself to whatever school of practice he deliberately prefers. When he has done so he should study it in all its parts and varieties, and he will find that originality springs best from knowledge. The actual forms of architecture obviously do not admit of indefinite variation. The possible curves of an arch or shapes of openings are soon exhausted. These things are as the grammar of our art, or more correctly, the language in which architecture expresses her ideas. As to such matters we need not be afraid of following precedents. None are so clever that they can afford to neglect the stored experience of the world, and when we see some nondescript design we remember the saying that "fools rush in where angels fear to tread." If the architect thinks of the purposes for which his buildings are intended, it is scarcely possible that he can be a literal copyist, while, as to the rest, it is better to copy good details than to invent bad ones. We have seen, in our review of architectural history, that while Gothic art cherished the vertical principle, the Classic architects, and the Renaissance revivalists, adopted horizontalism as their ruling idea. In ornamentation, the conflict has been between the natural and the conventional, not so much in the minor details as in the application of the higher artistic development of sculpture and painting. While men have cherished the old eccentricities of detail in their churches, the artists of the Renaissance went direct to Nature for inspiration. The old Greek worship of beauty became again with them a passion, and their saints recalled the gods and goddesses of old, by their idealisations of human perfections. To the Medieval spirit such ideas were abhorrent. If sculpture could be admitted to the sanctuary, it must be prescribed by conventional religious rules, which ignored the human element. The painter and the sculptor might dwell in an ideal sphere, peopled with saints and martyrs, but a reference to actual facts was forbidden to them. In as far as the Renaissance constituted a protest against such conclusions, it will not be reversed. Our architecture must welcome the best art of its time; and if we expect painters and sculptors to do their best in co-operation with ourselves, we must see that they are afforded free scope for the exercise of their genius. In determining the style of our architecture, such considerations should have weight. We must inquire not only into its special historical and aesthetic merits, but as to its adaptability to modern requirements, not forgetting its flexibility with reference to the assimilation of the sister arts.

SEWAGE POISONING: ITS CAUSES AND CURE.*

THE above is the title of a paper published by Dr. Edward T. Blake, M.R.C.S., read before one of the medical societies. The author observes that the objects of his work are twofold: first, to teach that many diseases which we look upon as unavoidable are really the reverse; and second, how we may defeat the twin demons—Ignorance and Indolence. Dr. Blake observes truly enough that there are certain conditions necessary to predispose us to the diphtheritic virus. In the case of children, it is necessary that the vitality must be lowered by exposure to sewage infection or some debilitating agency; that there must be actual loss of surface in the throat; and lastly, the presence of the diphtheritic germ. Again, he says the throat may be denuded, and prepared for an attack by catarrh, which latter corrodes the "mucosa" of the pharynx. We may observe, in short, that the author indicates the true explanation why some persons escape and others fall victims to these diseases, and he points out clearly their connection with the sanitary defects of our houses. The engravings which illustrate Dr. Blake's pamphlet show various typical arrangements, such as vastes acting as ventilators and cisterns saturated with sewer gas. Next the reader

is shown how these defects can be remedied, and the best made of a bad system, by disconnection of house-drains with sewer, and by air-shafts carried up on both sides of the house-drain, so that currents may be established in the system outside house. Among the evils of untrapped wastes are mentioned sinks, lavatory and bath wastes, the habit of turning the waste-pipe which drains tray under closet into the soil-pipe, &c., instead of letting it discharge outside. The author recommends soil-pipes to be placed outside the walls of houses, no metal being employed, and carried up above roof, in addition to a ventilating shaft leading from an inspection shaft on the sewer side of siphon, by which the gas passes up or down. Another diagram shows the connection of stack pipes. To continuous stack pipes communicating directly with house-drains and terminating above the window-heads, as in ordinary London houses, the author attributes immunity from disease, but he suggests that they should discharge over open gully traps. In short, Dr. Blake recommends the doing away with waste-pipes, or allowing them to discharge above gully gratings; ventilating soil-pipes, the removal of lids to j.w.c.'s D-traps; the abolition of cisterns for drinking purposes above closets, and the use of slate, or glazed stoneware instead of lead for the latter, open both to light and air. A dry area round every house is also recommended.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

GLASGOW INSTITUTE OF ARCHITECTS.—A meeting of this institute was held on Feb. 27; Mr. Campbell Douglas, the president, in the chair. The secretary then read the correspondence which had taken place between the council of the institute and Town Council of Greenock regarding the terms of the proposed competition for the new Municipal Buildings. The president said that while it was to be regretted that the Greenock authorities had disregarded their remonstrances, and refused to alter the stipulation limiting the rate of remuneration to 4 per cent., he did not think that the action taken by the institute laid any obligation upon its individual members to refrain from engaging in the competition. They by no means advocated uniformity of payment irrespective of circumstances.

COMPETITIONS.

CASTLEISLAND.—Out of several designs sent in for a new R. C. Church, Castleisland, Co. Kerry, Ireland, the designs of Mr. D. C. Coakley have been selected. The church is to cost £8,000.

SPALDING.—Drawings submitted in competition for the new Johnson Hospital at Spalding will be on view to-morrow at the Sessions House, Spalding. The cost of the building is not to exceed £4,000, and accommodation is to be provided for twenty patients and the official staff, and to include a semi-detached public dispensary. A premium of £50 has been offered for the best design. The conditions seem carefully drawn, and competitors for similar works may note the fact that architects are advised to read an article on Hospitals by J. R. Martin, pp. 1006–1063, in Vol. V. of "A System of Surgery," edited by Holmes (London: Longmans, Green and Co., 1871), and Machinell's Ventilation, p. 1025.

SCHOOLS OF ART.

MANCHESTER.—The annual meeting of the Manchester School of Art took place on Wednesday week. The annual report stated that the school had this year obtained 2 silver medals, 3 bronze medals, 4 Queen's prizes, 17 third-grade prizes, and 1 second grade prize. At the second-grade examination in May last, 17 students gained "excellent" and 29 "passed." A third-grade advanced examination to be held annually at provincial art schools had lately been instituted by the Science and Art department. Last year an examination was held in Manchester, when five of their students presented themselves. One obtained "good," and three "passed."

A paper was read on Tuesday evening, the 25th ultimo, before the Manchester Architectural Association by Mr. Charles Luke upon the subject of pneumatic sewerage. It was illustrated very plentifully with plans and details of the two systems invented by Captain Liernur and Mr. Isaac Shaw, C.E., respectively.

Building Intelligence.

ROTHERHAM.—On Saturday afternoon the first Board Schools which have been erected by the Rotherham School Board were opened. They are situated at Thornhill, and are built in the Late Gothic style from designs which have been prepared by Messrs. Tacon and Rawson, of Rotherham, who were appointed architects to the Board by competition. The schools are built of red pressed bricks with stone dressings, intermixed with ornamental terra-cotta work. The girls' and infants' entrance, which is carried up as a centre feature, is surmounted by a tower and bell turret. Each school has two classrooms, and altogether accommodation is provided for 700 children. The works have been carried out by Mr. Charles Ripley, of Rotherham, the contractor.

METROPOLITAN BOARD OF WORKS.—At this Board on Friday, the Works Committee brought up a report with reference to the whole question of the expediency of extending the tramway system in the metropolis, and especially the particular Parliamentary schemes of the present year. They recommended (a) That the Board do not consent to the construction of any line of tramway in any road or street within the Metropolis where the requirements prescribed by the statute regulating the distance between the kerb and the tram line have not been complied with; except where passing places are required in the case of single lines of tramway, or where there are special local circumstances requiring a modification of the rule. Subject to clauses inserted in the Bills, providing that the general Companies shall adopt with all reasonable despatch any requirements made by the Board of Trade, for such improvements in the tramways and their rails, as experience may from time to time suggest. Consent was given to the construction of the following lines of tramway, all others being refused:—North London Tramways—in Stamford-hill, between Bayley's-lane and Upper Clapton-road. South London Tramways schemes, viz.,—Wycliffe-grove, along Lavender-hill and Wandsworth-road to Nine Elms-lane; from that lane along Wandsworth-road and High-street, Lambeth to near Vauxhall-walk; and from this walk along High-street, the Albert-embankment, Palace-road, York-road, Stamford-street, and Southwark-street to High-street, Borough. London Tramways schemes, viz.,—along Borough-road from St. George's-circus to Newington-causeway; from Old Kent-road along Bermondsey-new-road, Grange-road, and Blue Anchor-road to Jamaica-level; from Raymouth-road, along Jamaica-level and Union-road to Deptford Lower-road; from Union-road along Deptford Lower-road to Rotherhithe New-road; from Jamaica-level, along Raymouth-road and Rotherhithe New-road to Deptford Lower-road; from Rotherhithe New-road, along Deptford Lower-road and Evelyn-street to High-street, Deptford; from Water-lane, Brixton, along Brixton-rise, Brixton-hill, and Streatham-hill to St. Leonard's Church, Streatham; and Waterloo-road from St. George's-circus to within 100 yards of the Surrey abutment of Waterloo-bridge (but not over that bridge). London Tramways scheme:—from Kentish-town-road, along Prince of Wales-road, Malden-road and Southampton-road to Circus-road. It was resolved to oppose the West Kent Main Sewerage Bill. Applications from the Fulham District Board for permission to borrow sums of £9,500 for sewerage, paving, and other works, and £7,700 for the formation of roadways and for asphalt pavings, were granted.

As many persons have interested themselves in the preservation of Wren's church at St. Mary-at-Hill, the destruction of which is threatened by the Metropolitan and Metropolitan District for the completion of the Inner Circle, it will be satisfactory to them to learn that the railway companies have agreed to insert a clause in the Bill which will insure the complete preservation of both church and churchyard.

The new church at St. Fillans, N.B., was opened on Sunday week. The church has been built in conformity with plans furnished by the architect to Lady Willoughby, who is evidently of an eclectic turn of mind, the style being described as "a mixture of Gothic, Dutch, and Flemish."

The Guardians of Marylebone accepted on Friday week the tender of Mr. Baker, of Lambeth, amounting to £109,348, for the erection of a new infirmary at Notting-hill.

* Sewage Poisoning: its Causes and Cure. By EDWARD T. BLAKE, M.D., M.R.C.S. London: Hardwicke and Bogue.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—R. C.—J. J.—P. and S.—J. W. S.—G. R.—T. C. H.—H. B.—R. and E.—R. C.

R. W. B. (Write the Secretary at Burlington House.)—C. F. W. (Rather beyond our province. We have inserted the query in the *English Mechanic*, wherein it will appear, and will probably be replied to.)

PHIPPS.—(The treatise on "Masonry" in Weale's series, and another published by Messrs. Cassell on "Tracery" in their technical handbooks, will be found useful.)

PER ARDUA.—(If the plans are tinted yellow, the sectional part should also be tinted that colour, though red is the proper tint for brick walls, both in plan and section.)

"BUILDING NEWS" DESIGNING CLUB.

DESVICH. (There is, as you found out, a resemblance between "Mechlin's" design we published last week, and the Swan Inn, Llanmilling, but not greater than we have seen before between works of architects of repute. It is impossible for us to become detectives in every case of this kind, and if some architects are found dishonest enough to "crib" from others' designs, can we wonder at the infection spreading?—"Triangle in Circle," (sent.)

DRAWINGS RECEIVED.—"Ubique," "Cymraeg, J. G. in squared circle, Pat Norwich, Through and Dagger.

Correspondence.

NEW PREMISES OF THE ART UNION OF LONDON.—EXTORTIONATE CHARGES.

To the Editor of the BUILDING NEWS.

SIR,—The Art Union Society's Offices illustration in last week's BUILDING NEWS is good in parts, and has a generally pleasing effect in execution. Because it has such merit, one cannot but be surprised by the perverse eccentricity which it manifests. General precedent and common-sense notions of propriety dictate that the more massive part of the design should be below, the building getting lighter and more ornamental in treatment towards the top. In this design such rule is reversed, the most massive story being the upper one! The three stories (each good in themselves) want transposition: the upper one to come to the bottom; the bottom one to the first floor; and the ornate and elegant first floor treatment to the top. Of course, this only strictly refers to the character of each floor; if so transposed some alteration would be involved. The objectionable heaviness of the upper floor is further augmented by the solid attic over it, which is in harsh contrast to the light balustrades on lower floors. What a

pity the roof was not hipped, and an open balustrade put also on the top.

Allow me to say a word on another subject, which may be a useful hint to many. I lately sent an advertisement to the BUILDING NEWS, as also to another architectural paper. From the latter came a demand for 10s. 6d., to be paid in advance. I was too busy to attend to it, and supposed it would really make no difference. The advertisement, however, did not appear. It duly was published in the BUILDING NEWS, and the charge, I find, is 4s. 6d. —I am, &c.,

M.

COLOUR IN ARCHITECTURE.

SIR,—I have read with some surprise your report of a paper by Mr. W. Tonks read before the Birmingham Architectural Association. Mr. Tonks tells us that "the polished surfaces of granites and coloured marbles are but slightly affected by the atmosphere." Now this is dangerously misleading. The polished surfaces of granites may stand, but Mr. Tonks can find no example in England where the polished surfaces of coloured marbles have stood exposure to the weather for more than a few months. When he is next in London let him look at the fountain at the corner of George-street, Westminster; it will probably satisfy him upon this point. Farther on he remarks, "the use of terra-cotta of different colours is now common on the Continent, though but little adopted in this country." In what Sleepy Hollow can he have been reposing? Will he kindly tell us any modern public building on the Continent where terra-cotta has been used to such an extent, and with as much success, as in the new Natural History Museum at Kensington? If he were a constant reader of your paper he would find that he has made an altogether erroneous calculation of the amount of this material used by English architects. In speaking of things at home he is still more inaccurate. He tells us that terra-cotta has been used with good effect upon "the Grand Hotel" and the "School Board offices." As a matter of fact there is not an inch of terra-cotta upon the Grand Hotel, and no such building as the School Board offices exists. Indeed, it was only a few days ago that a member of the Board claimed for that body the merit of almost Spartan virtue because they had spent none of the public money in building a house for themselves; that, while the Town Council were seated on velvet, the members of the Board were content with wooden chairs—board to board in fact. I would not trouble you with this, only that I am of opinion that two things are absolutely necessary for a lecturer: firstly, that he himself should understand something of the subject he is talking about; secondly, that his statements, to be of any value, should be correct.—I am, &c.,

A BIRMINGHAM READER.

DISTRICT SURVEYOR'S FEES.

SIR,—A decision, given by Mr. Newton on Tuesday last at the Marlborough-street Police-court, in the case of Kerr v. Adams and Son, appears to me of so much importance to architects and their clients, as well as to contractors, that I should be glad if you would allow me to draw the attention of your readers to the facts of the case. I have recently been engaged in designing and superintending some extensive alterations at the Army and Navy Club, the building contract for which was let to Messrs. Thos. Wontner Smith and Son, with the usual clause that they should give notices and pay the district surveyor's fees. Notice was duly given by them, in which some of the structural alterations were named, and *etc., etc.*, placed after them to cover the rest. During the progress of the works, various firms were employed by the Committee to put in sundry fittings—amongst others, Messrs. Adams and Son, the well-known engineers of Marlborough Works and the Haymarket, who contracted to put in some new hot-closets, with the necessary steam-pipes, *etc.* Mr. Kerr, on hearing that this was being done, summoned them for not giving him notice, and also for placing a steam-pipe within less than six inches of any combustible material; the penalty in each case being £20; although he had never previously communicated with them or given them any notice to alter the pipe, which, by the way, was fixed in error and altered before the summons was delivered. Mr. Newton ruled that he was entitled to a notice from Messrs. Adams and Son, as the steam-pipe was not mentioned in the

notice given by Messrs. Smith and Son to the builders. Now, the question arises, if the district surveyor is entitled to a notice from every contractor employed, will he be entitled to a fee from each?

In a large building like this I venture to think this is a serious question. One other contractor, employed to put in an additional boiler, did, I am informed, give notice, and others are perhaps liable to be summoned for not doing so, thus there may be some five or six large fees charged on the same building for works all going on at the same time, and to which the district surveyor has made just one visit of inspection, as Mr. Kerr admitted to be the case, though he stated he had sent a clerk at other times. If I am right in assuming that all who give notice will be severally liable to pay the fees, it will be necessary, where several contractors are employed, to see that one gives notice for all, and in doing so to see that every item of the works is specifically given in the notice; no easy matter in works of such a character as the one now in question.—I am, &c.,

HUGH ROUMIEU GOUGH.

ARTISTIC BLOWER TO OPEN FIRE-PLACES.

SIR,—Has not Mr. Edward Starr, who wrote to you on this subject last week, rather missed the artistic value of the iron bar at the bottom edge of the glass blower? He says the bar "makes an unsightly line across the fire-opening," and adds that he considers a shaped and ground edge an improvement. In my opinion glass treated in this way would be open to considerable objection, and that the iron or brass frame is not only a constructive advantage, but an artistic necessity.—I am, &c.,

AN OLD TEE SQUARE.

R.S.A. EXHIBITION.

SIR,—An "A.R.I.B.A." should know that two blacks do not make a white; that, whether his church or spire were the after-thought, the scale of either is too large. At least, that seems to be the reason why the effect is not artistic. A large scale reduces the space available for surroundings, which help to gauge the proportions of an edifice, and help, also, the making of a picture. But this is not the head and front of its offending. It creates larger blank surfaces, which must be all etched over. When this is not done with taste, the expressive lines are lost or impaired in their effect by the coarse surface lines, which express nothing of design at all. The light and shade is lost, and the result is general confusion—whatever its effect may be upon a building committee looking out for something big.

The notice mentioned by Mr. Fairley refers exclusively to oil-paintings and broad gilt frames. Mr. Fairley's design would not only have been admitted by the hanging Committee, but it would have done more justice to itself—had the frame been as it is and the picture less. It is not so much the size as the shape of the drawings which makes the packing present arrangements, which look as if a little consideration could have made them better. The task of hanging the oils is a heavy one, compared with which the arrangement of architectural sketches is a trifle. With a few exceptions in respect of the principal positions, the work is probably left to the discretion of the journeyman joiner, as being beneath the artist's notice, or probably beyond his criticism.

In the matter of towers and spires, and picturesque embellishment of church design—the following notice of a church, built by Lady Willoughby, at St. Fillans, on Loch Earn, and opened recently, appears in the local print:—"The church is seated for 250, and is an exceedingly neat, commodious, airy, and well-lighted edifice. The style of architecture is a mixture of Gothic, Dutch, and Flemish, and the little church, with its bulbous tower, relieved by the dark, rugged hills behind, forms an object of beauty in the landscape." If the Highlander is not so consistent as Mr. Shaw, he is, at least, more cosmopolitan in his taste.—I am, &c.,

R. S. ACADEMY.

SIR,—Whatever your correspondent, "R. S. Academy" may have intended in his remark "inevitable tower and spire," and its relation to the rest of his critique, I have merely to consider the statement as it appeared in your columns, where it is distinctly and exclusively part of a sentence referring to a special design. It is, to say the least, somewhat disingenuous of your correspondent to represent it as having any other implication. He surely has not seen his communication in print. Allow me to repeat his words: "A U. P. Church in Dundee is a water-colour sketch of a design in the

Norman or Romanesque, and comprises nave and transepts, with the inevitable tower and spire at the corner."

I am quite aware that the general principle, as your correspondent expresses it, is of more consequence than the details of the design referred to; but I also know that when any special design is commented upon in connection with inaccuracy of analysis, it is neither creditable to the critic, nor just to the design criticised.

It may satisfy your correspondent to justify his use of the term "spire" by reference to popular opinion thereon, but he might have remembered that professional readers have a preference for technical accuracy.—I am, &c.,

Dundee.

G. S. AITKEN.

*** We can insert no more letters on this matter.

Intercommunication.

QUESTIONS.

[5699].—**Driving Sewer Headings.**—I should be obliged to any correspondent who would give me a description of the plan pursued in laying drain-pipes, and constructing brick sewers in tunnel; with the method of timbering, the removal of excavation from the heading; the distance apart necessary for shafts, manholes, &c. I.—Rushton.

[5700].—**Bricks.**—"Student," in thanking Mr. Ambrose and "J.S." for so thoroughly clearing up the girder question, wishes to ask where he might find some information about bricks, as to different kinds and qualities, and how to distinguish one from another. For instance, how to know kiln-burnt from clamp-burnt; hand made from machine made, and good qualities from bad.—STOENT.

REPLIES.

[5652].—**Casts of Carving.**—"Harry Hems" is as impatient at being corrected as a spoiled baby. He stated that pipe-clay was found principally near Chudleigh. Now, as some of your readers seeking further information might, on the strength of such a statement, proceed through Newton Abbot to Chudleigh, a distance of six miles, only to find that they must return to the former place again for what they required, I thought it a pity that people should be so misled, and without the slightest animus against "Harry Hems," who is an utter stranger to me, I remarked in your next issue that the clay was found in the neighbourhood of Newton Abbot, and that the merchants had their places of business in that town and the neighbouring village of Kingsteignton. For making this kindly-meant correction, "Harry Hems" says I am "censorious." The following corrections of "Harry Hems's" statements in your last number are reliable:—Newton Abbot has a population of nearly 10,000, and is the market and business town of the important district which includes all the chief watering-places of South Devon. Chudleigh is a small inland town with a population of less than 2,000, and has been void of animation ever since the coaching days, which preceded the railway era. The pipe and potter's clays are found in the parishes of Kingsteignton, Newton Abbot (Wolborough and Highweek), Henneck, Teignrace, and Bovey Tracey. The clays are the result of decomposed granite, and give employment to a considerably larger number of hands than the 200 named by "Harry Hems." Between 50,000 and 60,000 tons of these clays are taken down the river during the year to be shipped at Teignmouth, and large quantities are forwarded by rail to Dartmouth, for the same purpose. Messrs. Watts, Blake, Bearn and Co. have works for china clay of a very different material to the clays mentioned above, at Cornwood and St. Austell, but their office is situated only at Newton Abbot. Messrs. Brown, Goddard and Hatherley's office is at Kingsteignton. This is the oldest firm in the trade. The Devon and Courtenay Clay Co.'s office is at Newton Abbot. The Devon and Somerset Clay Co. (Limited), has its offices in London. The last-named Co. is a small one, and has recently commenced business. The latest published return of the shipping dues of the different companies at Teignmouth is dated July, 1877. According to it, Messrs. Watts, Blake, Bearn and Co. paid £211 6s. 8d.; Messrs. Brown, Goddard and Hatherley, £113 5s. 10d.; Messrs. Whiteway and Mortimer, £86 19s. 5d.; and the Devon and Courtenay Clay Co., £82 18s. 11d.—J. B.

[5674].—**Ordinance Datum.**—In the "Abstract of the Principal Lines of Spirit Levelling in England and Wales," by Colonel Sir H. James, published by order of the Secretary of State for War, and sold by Longman and Co., there are thousands of recorded heights above Ordnance Datum over the whole of England, along the lines of levelling, and very probably the marks will be referred to which "Beta" requires. The "Datum Level" for Great Britain is the level of mean tide at Liverpool from observations of the Ordnance Surveyors, which is eight-tenths of an inch above the mean tidal level as shown by the self-registering tide gauge on St. George's pier at Liverpool.—M. V. and M.

[5692].—**Girders.**—"Student" does not state, in his question, the whole of his case. The rule he quotes from Tredgold is for the deflection of beams, while that which he quotes from "Hurst's Handbook" is for the strength—that is for the breaking strength. Both are correct when properly applied.—C. S.

[5694].—**A Young Architect's Library.**—It is impossible to give a list of books that shall suit all students, much less casual readers. I will, however, give a list of works under each of the heads suggested, that will be found reliable. 1. Mathematics: Todhunter's "Geometry for Beginners," the same author's "Trigonometry;" Tarn's "Geometry for Architects;" Gregory's "Mathematics for Practical Men." Surveying: As an elementary

book T. Baker's "Mensuration and Land Surveying," in Lockwood's series; Simons on "Levelling." For measuring and valuing, Dobson and Tarn's "Student's Guide," is perhaps the best, though there are many other elementary works that may be named. Ryde's "Text Book." Under Construction, &c., I would recommend as elementary works, the treatises in Weale's series. Tarn's "Science of Building," Fenwick's "Mechanics of Construction," Rankine's "Applied Mechanics," Prof. Moseley's "Mechanical Principles of Architecture," Tredgold's "Carpentry," Fairbairn's "Application of Iron to Building," Barlow on "The Strength of Materials," Stoney's "Theory of Strains," Hatfield's "Transverse Strains," "Treatise on Construction," in "Encyc. Brit.," also "Architectural Dictionary," Burnell on "Limes, Cements," and Reid on "Portland Cement." Donaldson's "Specifications." The Vols. of Building News. Laxton's "Examples of Building Construction." Robinson's "Domestic Architecture," Wightwick's "Hints to Young Architects," Guillaume's edition. Under purely Architectural and Ornamental works, I would name the following, though the list may be largely extended in this branch. Fergusson's Handbook, his "Hist. Principles of Beauty"; Parker's Glossary; Stuart and Revett's "Antiquities of Athens"; Wilkin's "Roman Architecture"; R. Wood's Works; Sharpe's "Architectural Parallels, Seven Periods"; Ruskin's "Seven Lamps"; Scott's "Lectures on Medieval Architecture"; Paley's "Mouldings"; Pugin's "Principles and Specimens"; Shaw's "Specimens of Elizabethan"; Johnson's "Architectural Sketches in France"; Nesfield's "Specimens of Medieval Architecture"; Dalhousie's "Examples of Domestic Architecture"; Parker's ditto; J. B. Waring's "Illustrations of Architecture and Ornament"; Owen Jones' "Grammar of Ornament"; Viollet le Duc's "Dictionary"; Gwilt's "Encyclopædia"; Audsley's "Dictionary of Architecture," &c. Works on ornament, and examples of old buildings in various styles are too numerous to mention, but the above works still form a good nucleus, and are all reliable and standard works.—G. H. C.

[5695].—**Measuring Plaster Work.**—Walls to be measured from top of grounds to half-way up cornice. All openings above 6' 0" super. to be deducted.—B.

[5695].—**Measuring Plaster Work.**—When plasterers find materials, deductions must always be made for doors, windows and fireplaces, and the returns at the tops and sides of doors and windows must be measured separately; but for workmanship only, these deductions are generally omitted, the plastered returns being allowed to counterbalance them. Deductions are never made for cornices, enriched mouldings, festoons, or other ornaments; because the spaces occupied by them are invariably plastered previously to such ornaments being made. If cornices do not exceed 9 inches in girth, they are rated at so much per foot, lineal measure; but all above this girth are computed by the square foot.—W. C. SHADDOCK, Plymouth.

[5695].—**Measuring Plaster Work.**—Rendering to walls is measured by taking the length by the height, the latter being taken from the top of the skirting grounds to the ceiling, and where there is a cornice it is customary to deduct from this dimension half the height of the cornice. Lathing and plastering to partitions is measured in a similar manner, with the exception that where cornices occur it is customary to deduct only one-third the depth of cornice from the height, instead of one-half as described to walls. In case of deductions for doors and windows, take the full dimensions for length and height to the outside of grounds, and not the net dimensions. In the case of doors the height, where there is a skirting, must be taken from the top of the skirting grounds, and not from the floor, so by deducting the full measurements of all openings that occur from the superficial area, the net dimensions of the plasterers' work is obtained, which is the usual way of measuring it. The hollow behind the skirting boards harbours vermin, and the plastering is sometimes continued down to the floor so as to fill it up; when such is the case, a superficial area should be taken of that and describe as rough-plastering behind skirting boards. You will see by the above that the small window you mention in your question, 3 feet x 3 feet = 1 yard super., will have to be deducted from the area to obtain the net dimensions.—ANTHONY WATSON.

[5695].—**Measuring Plaster Work.**—If you form the quoins of the openings or strike a quirk round a bead, unless paid extra for the same, you can measure the whole opening. If you plaster behind the skirting you can measure from floor to ceiling, otherwise you can't.—W. S. TIPPERT.

[5696].—**Brick Wall.**—Tie the two portions of the wall together every fourth course with iron ties about 2 feet 6 inches apart; 1 inch x 1/2 inch opened at the ends dipped in hot tar.—G. B.

[5696].—**Brick Wall.**—The cavity "C. C. C." means must be a 2 1/2 inch one, not 1 1/2 as printed. The method of tying the 9-inch wall to the 4 1/2-inch wall is simple enough. Wrought-iron cramps, dipped in tar, or of galvanised iron, are the best to use; these are strips of flat bar iron, about 8 or 9 inches long, and about 1 inch wide, forked at ends by a slit in middle. In the centre the bar is bent, so as to prevent the lodgment of mortar droppings. These cramps ought to be placed, say in every fourth or fifth course, and about 2 feet 6 inches apart. They are best set in cement, though common mortar is generally used. The positions of the cramps should alternate with one another in the different courses, so as to secure a uniform tie. The principal caution to be used is that the mortar droppings should be carefully removed from them as the work advances, so that there should be no connection between the outer and inner walls.—G. H. G.

[5696].—**Brick Wall.**—The best way to tie a hollow brick wall is with some pieces of flat iron. It must first be heated, and a twist be made in the middle, to keep it from conducting the water.—W. S. TIPPERT. St. Columb.

[5696].—**Brick Wall.**—Hollow walls, such as "C. C. C." describes, generally have wrought-iron ties across the cavity. These ties should have the ends split or "caulked," so that they may be well bedded into the brickwork. If the portion in the cavity is bent a little in the shape of a U, it will prevent any water passing from one side of the brickwork to the other.—R. J.

[5696].—**Brick Wall.**—A 16-inch hollow brick wall.—It is best to have the 4 1/2-inch portion at the outside, and the 9-inch in the inside, leaving the cavity of 2 1/2

inches, instead of 1 1/2, as stated in your question. The advantages of the thin portion outside is, 1st, That the damp is at once intercepted by the air space, keeping out of the greater portion of the wall, and at a considerable distance from the interior of the building. 2nd, The roof can be economically arranged so as to rest upon the interior thicker portion of the wall. Ties of wrought iron are better than bonding bricks, and have the advantage of not being liable to be broken if the wall should settle unevenly. They are generally about 8 inches long, 1/2-inch wide, by 1-10-inch thick; they are placed about 3 feet apart horizontally, and with 9-inch or 3 courses of bricks vertical intervals between the rows. Each tie is either bent in the middle, or twisted to stop the passage of water along its surface, or as to stop the centre, so as to answer the same purpose, and to give them strength to resist compression. The ends are split longitudinally and corked or caulked, i.e., turned in opposite directions, right and left, so as to have a better hold of the brickwork.—ANTHONY WATSON.

[5697].—**Weight of Wrought Iron Girder.**—The weight of a riveted plate girder, as given in Mr. Banister Fletcher's book on "Quantities," Fig. 38, p. 92, worked out at 40lb. to the foot superficial of 1 inch comes to 16cwt. 2qr. 2lb. exclusive of rivets; the rivets come to 3qrs. 14lb. Total, 17cwt. 1qr. 16lb.—ANTHONY WATSON.

[5697].—**Weight of Wrought Iron Girder.**—The weight, viz., 12cwt. 1qr. 25lb. is a misprint; it should be 17cwt. 2qr. 0lb. This error was evidently not discovered until after the second edition of Mr. B. Fletcher's valuable work was published, when it was corrected. Independent of rivets I make the weight 16cwt. 1qr. 27lb. 6/360 = No. 360 of 2 1/2" x 3/4" rivets = 1cwt. 1qr. 0lb. Total, 17cwt. 2qr. 27lb. The difference, viz., 27lb., may arise from the different methods of calculation; or, perhaps, I may, with "Learner," not rightly understand the item for rivets; yet, by taking the rivets as 3/4" diameter, I make the total 7lb. more still. The following alterations appear in the second edition of the items referred to by "Wm. W.," but the others remain the same:—5th Item 2, 3.10; 9, sunk work, (top); 10th, 1 nitre; 11th, 500; 6, egg and tongue carving; Last, 2 narrow circular, &c. As to measurement, I hope to see some explanation by Mr. B. Fletcher, or one of your many readers.—BROTHER LEARNER.

[5697].—**Weight of Wrought Iron Girder.**—I also am not in the possession of sufficient "ingenuity" to work out the weight of Mr. Banister Fletcher's girder so as to make it 12cwt. 1qr. 25lb. "Learner" will see that there are 60 rivets in each row, and as there are 6 rows of rivets 2 1/2 in. long we get 75ft. of metal pin in diameter. The following is what I make the weight of the girder to be:—

20'0	16 = 30'0 in. web	= 7'6 one inch thick.
20'0	9 = 15'0 in. bottom flange	= 7'6 " " "
20'0	9 = 15'0 in. top do.	= 11'3 " " "
4) 20'0	8 = 53'4 in. angle irons	= 20'0 " " "
		46'3

6) 60'2 in. by 1/2 in. rivets.
6 x 60 x 2 1/2 in. = 75ft. x 1/47lb. (the weight of 1ft.) = 110'25lb. in the rivets. 46'3 x 40 (the weight of one superficial foot of metal in. thick) = 1850lb. Thus in the whole girder we have 190'0'25lb., or 17cwt. 2qrs. 0lb. With regard to taking the rivets, it is not generally the practice to add 5 per cent. on to the weight of the web, flanges, angle iron, &c.—R. J.

STAINED GLASS.

ST. EDWARD'S CHURCH, CAMBRIDGE.—The east window of this church has been filled with stained glass by Messrs. John Hardman and Co. It is of the Decorated or fourteenth century period, and consists of five lights and tracery. It has been treated with rich canopy work, and each light contains two subjects, the upper one being the more important. The five main subjects are: The Adoration of the Magi, Baptism of Our Lord, Crucifixion, Angel Appearing to the Holy Women at the Sepulchre, and Supper at Emmaus. The smaller groups beneath are: The Angel Pointing out the Star to the Magi, St. John Pointing out Our Lord, "Ecce Agnus Dei," the Carriage of the Cross, St. Mary Magdalene Sitting at the Tomb, and the Journey to Emmaus. A handsome brass plate, also by Messrs. John Hardman and Co., is placed beneath the window, and records the intention of the donor.

TEDDINGTON.—Six stained glass memorial windows have just been placed in the Church of SS. Peter and Paul, Teddington, Middlesex,—four in the south, and two in the north aisle. The windows are single light ones, and contain, respectively, the figures of St. Peter, St. Andrew, St. James, St. John, St. Paul, and St. Jude. The work has been carried out by Messrs. Powell Bros., of Leeds (whose agents in London are Messrs. Chubb and Son, of St. Paul's Churchyard), the designs having been previously submitted for approval to Mr. G. E. Street, R.A. Messrs. Chubb have also supplied eight coloured windows by the same makers for a gentleman's house in South America. The windows are square, and are to be set in the panels of doors, the centre pieces being elaborately-executed figures of the seasons, &c.

The death is announced of Mr. John Cotterall, builder and contractor, of Blackburn, at the age of 41. Amongst the contracts he carried out was the free library, St. Joseph's Catholic chapel, Harwood-street Wesleyan chapel, the new cattle market, and many other important works. He was a member of the Town Council.

LEGAL INTELLIGENCE:

DANGEROUS HOUSES.—At Marlborough-street on Friday last, Mr. Napier, on the part of the Metropolitan Board of Works, applied to Mr. Mansfield under the Building Act, 15 and 19 Vic., cap. 122, section 80, for an order for the removal of the inmates of the houses, 17, King-street, and 74, Cross-street, those houses having been certified by Mr. Kerr, the district surveyor, to be in a dangerous state. Orders had been already made at that court, but had not been carried out. Although the application was an *ex parte* one under the Act, yet out of courtesy to Mr. Fletcher notice had been given to him that an application was to be made so far as regarded 17, King-street. Mr. Kerr gave evidence to the effect that the house was in a most dilapidated state and might fall at any moment, and also that the order of the Court had not been obeyed. A person asked for an adjournment on behalf of Mr. Fletcher. Mr. Mansfield said that after what had been stated by the surveyor he should make an order.

Our Office Table.

DURING the past two months many additions have been made to the Parkes Museum of Hygiene, and it is expected the museum will be opened to the public before the end of April. The additions to the contents include drawings of the Peabody-buildings for the Poor, presented by the architect, and a number of designs for cottages, villas, &c., by Mr. Norman Shaw, R.A. The collection of sanitary appliances now includes several patents by Messrs Tonks and Son, of Birmingham. The library now has in it upwards of 400 volumes, exclusive of pamphlets. Pending the opening of the museum to the public, tickets of admission may be had on written application to the curator, Mr. Mark H. Judge, University College, Gower-street.

MR. OGLE TARBOTTON, F.G.S., the borough engineer of Nottingham, has just published a pamphlet on the Meteorology of that town—the result of observations conducted by him during the last 12 years. The diurnal observations are made at 9 a.m., and the instruments employed are those of Messrs. Negretti and Zambra, and Mr. Casella, of London. The barometers are corrected by James Glaisher, Esq., at the Royal Observatory, Greenwich, and the thermometric readings are taken 4ft. above the ground on shade and on the grass; those in the sun are taken with a blackened bulb in vacuo. Rainfall is gauged on the ground, and at a station 39ft. above the ground level. The latter part of the observation will be found of general interest. Looking at the register of rainfall collected at Nottingham during last year, we find that the greatest rainfall recorded in 24 hours was on July 25, when 1.152in. fell. The largest quantity recorded under “total rainfall per month” was in August, or 6.453in., and the least in March, .586in. The total rainfall in the 12 months is 28.842in. All the observations have been reduced to mean values.

A MEETING of the master brickmakers of the London suburban district was held on Monday afternoon, at the City Terminus Hotel, Cannon-

street, for the purpose of discussing the question of wages, and to decide as to the reduction to be made therein during the ensuing season. Mr. Rhodes occupied the chair, and stated that the matter had already been discussed at Wimbledon. In addition to the question before them, other questions might be considered, notably the one whether or not it was expedient to form a brickmasters' central association. Rating upon brickworks had now assumed a matter of considerable importance to them, since the whole country had been put under the operation of the sanitary laws, and consequently under sanitary rates. After some discussion, it was unanimously resolved that, in the opinion of the meeting, a general reduction of 6d. per 1,000 bricks should be made in the moulding price during the ensuing season. A committee was nominated to draw up a scheme for the formation of a central association, and report upon the same to an adjourned meeting.

MR. JOHN BURNS, of the Cunard Company, in a letter to the Provost of Glasgow, points out a reason why there is distress in that city. His company is fitting up a new steamship called the *Gallia*, and on Saturday the Belgian workpeople, who were laying down parquetry on the cabin floor, instead of leaving at one o'clock, as Scotch or Englishmen would have done, asked permission to go on till dark so as to finish their job:—“The entire panelling of the *Gallia's* cabin has been executed by Japanese carpenters, and the ironwork of the office in which I now sit was made in Belgium. Instance after instance could be given of how all nations are competing with us, not only as regards the manufacture of articles used in their respective countries—hitherto to a great extent supplied by Britain—but the artificers of foreign countries are, in spite of us, advancing into our own country, and compelling us to employ them, simply because they can do our work as well and much cheaper than it can be done by our own workmen. What does this bring us to but that the arbitrary curtailment of the hours of labour is a snare and delusion to our working classes, and the sooner they cast to the winds the doctrine of those who are imposing upon them the better for themselves? That doctrine tells the working man that he should not work longer than fifty-one hours in the week. That doctrine is nuts for the foreigner to crack, and is ruining our country and our countrymen.”

MR. C. R. ANDREWS, the surveyor to the Bournemouth Commissioners, has sent us details of house-drainage as required by the by-laws. The plan of publishing a sheet of sections and details is a desirable one, as there are many builders who are apt to disregard the written regulations. In the sheet before us a block plan for two houses, semi-detached, is shown with the position of the drains, soil-pipes, inlets and outlets for ventilation, road ventilators, &c. The sections show the mode of disconnection and the fall of house-drains, which is marked 1 in 20. In the details the soil-pipe is shown carried up above eaves, and there left open; the closets are connected with the soil-pipe, and the sink waste discharges on an outer gully. In the sections of

basement dry areas are indicated, and the walls are built hollow and tied with wrought-iron ties placed 24in. apart, and at every fourth course in height. Under the basement floor there is a layer of concrete and a space for ventilation, the walls have also concrete under-footings. Openings for ventilation are shown over every closet, and the waste-pipes are all discharged externally. The details are large and clearly drawn, and if the arrangements are carried out systematically, Bournemouth will enjoy greater immunity from infectious diseases than it has ever done.

A SKATING rink, offering 16,000 square feet of artificial ice in one sheet, is in successful operation in New York. This enterprise of Mr. Rankin is notable chiefly for its magnitude. Something like nine miles of gas-piping are required for circulation of the refrigerating liquid, which is pumped through after being in a freezing chamber some 250ft. long, where ice is liquefied by means of salt and other solids. The principle involved is simply that of the ice-cream freezer. A tight floor was laid over a surface 200ft. by 80ft.; on this floor a network of pipes was laid, and the whole flooded with two or three inches of water. The surface of the ice remains dry, though the atmosphere of the rink is warmed by half-a-dozen large furnaces. The temperature of the refrigerating liquid is said to be raised only 10 degrees while on its nine-mile journey.

GREAT precautions are being taken at Marseilles against entrance of the plague. More than two million francs have been devoted to quarantine arrangements and the storing of merchandise to be disinfected. M. De Lesseps has deplored these arrangements as fit to ruin the Compagnie des Messageries Maritimes without any compensating advantage. He thinks these quarantines powerless and useless. He recalls the circumstances of the destructive plague which he personally observed in Egypt in 1834; in Alexandria alone it caused 45,000 deaths in six months. M. De Lesseps affirms there was not a single case of transmission by contact, and where a village was attacked it was sufficient to remove the inhabitants, bathe them in the sea, and change their clothing, to make the mortality cease entirely. The plague, moreover, did not spread beyond Lower Egypt, though communication with Upper Egypt was not interrupted. M. De Lesseps desired the Academy to protest against the system adopted at Marseilles, as likely to rouse unnecessary alarm, &c. M. Bouley strenuously disputed M. De Lesseps' conclusions, and urged the analogy of the plague to cattle disease, which had been mastered in France by energetic measures (killing all affected animals, and keeping the frontier absolutely closed against those which were suspected).

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THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 14, 1879.

ART AND ARCHITECTURE IN JAPAN.

FROM no country and no nation in the world can Europe gain more teaching, in matters of art generally and architecture especially, than from Japan and the Japanese. The superb folio just issued from the Imperial Press, at Hahodadi, is one among the most remarkable illustrations of a combination of Western and Eastern ideas. It might have been more characteristic, perhaps, had it represented a purely Asiatic type; yet it becomes more historical as exemplifying a change from the primitive to the new. In a great degree, however, this rich volume deals alone with the past, and with the earliest stages of those inventions and manners which really constitute the first developments of civilisation. Thus, Japanese architecture: it occupies the opening chapter of the Japanese annals. There seems never to have been a time in those islands when men were content with huts of branches and caves as habitations, or with hollows in the rock as habitations. They did not possess, of course, the refinements or ambitions of Greece, or Rome, or Assyria, yet they could build castles vieing in strength and grandeur with the Norman, palaces of Italian grace and luxury, and private abodes abundant in both imagination and taste. But there was always, as the artists of the magnificent volume before us plead, one capital deficiency for which they could never atone. The Japanese group, notwithstanding all its other riches, possesses little granite, and no true marble. While, therefore, despising the resources with which the barbarian inhabitants of other regions were satisfied, the people of this region thought that they might "create an architecture, so to speak, out of wood. They made the attempt, and, in a manner, they succeeded. The plan was necessarily limited; the scope was confined; no edifices so reared could suggest the idea of secular duration; they could present neither grand vertical nor horizontal lines; they were built upon vast multitudes of piles, covered with immense shadowy masses of roof, broken into many curves and angles, distorted by eccentricities which in timber may be permissible, though they would be atrocious in stone, and yet the large effect, as set before us in chromo-lithograph, is not displeasing. We have a first, a second, and a third floor of buildings surrounded less by walls than by arcades—which give an appearance of lightness to the whole perspective—and, when the galleries of approach are really inclosed, they are usually made light and cheerful by gaily-painted paper. Something of a Pompeian character, indeed, pervades these vestibules and lobbies, although the human figures are far less graceful than the Greek, while the pornography is even more atrocious. There are doors opening upon windowless interiors, passages with wide-seated bays, looking apparently upon lawns of green, sprinkled with tinted beds of flowers, porticoes where none were to be expected, conducting to geometrical gardens, and immensely wide avenues without a curve, but breaking off at right angles into others, which deepen down into flat perspectives of forest-land. In all this we detect the universal tradition of Japanese, and, indeed, of Chinese and Mongolian art and taste, generally. It is naturalism in full freedom. "Why," asks one of the Imperial authors, "should we build cloisters, when all we want is plenty of air?" Still, other motives

must have been at work. Stone, as we have hinted, is not altogether wanting in Japan. It is the material of which the foundations of all the island temples are constructed; and it supplies the pavements of the more important towns. The Imperial report is seriously emphatic upon this part of the subject; and especial attention is drawn to the fact that the result of all this wooden architecture, if the term may be employed, is by no means monotonous. There are, in Japan, two classes of sanctuaries: the one formed of dull, unpainted, deal boards; the other roofed over with earthen tiles, variegated and fanciful, with crooked horns at every corner where it is found possible to place one. Under these, the church architects of China suspend bells; in Japan bells as appurtenances of such structures are forbidden. A gong, hung up at the gate, gives notices to the worshippers who may be waiting upon the ceremonial of the day. Half the edifice often consists of portico; beyond this a wall, pierced by a door, inside, as in the Greek temples, an almost too light interior. Here and there, square or rounded timber columns, sometimes a metal base or capital; between the pillars, huge curved masses of roughly-sculptured wood; in the centre, the solid trunk of a tree, surmounted by an elephant's head carved in pine. Between this and the base, however, occur ranges of fanciful decoration such as might do credit to the toy-makers of Nuremberg themselves, though the most remarkable circumstance in connection with them is the perpetual reproduction of the pyramidal, or flame-shaped, figure. Externally, moreover, a Japanese temple has its auxiliary appendages—an hyperboreal gallery, a fountain for religious ablutions, a miniature pagoda of three, four, or five stories, columns in couples, and almost purely Doric in style; lion-forms resembling those exhumed in Assyria, and stone lanterns which have no counterparts among the archaeological discoveries in any other place on the surface of this globe. Amid all this eccentricity, however, one feature is salient,—the disproportion between the height of the columns and the weight of the roof, aggravated, perhaps, by the roughness of the rude low arches, the grotesque attempts at carving, the singular suggestions of Roman and Gothic to be here and there detected, and the manifest association, everywhere, with the barbaric mannerisms of China. The Chinese were our masters, say the compilers of the Imperial Report, with admirable modesty, but they go on to plead that their chief material in architecture and art, with the exception of their inimitable lacquer, is the bamboo, out of which, they pathetically add, "we cannot be expected to rear either a Parthenon or a Pyramid." And yet they contrive to cut vast staircases from base to summit of their solid mountains, and their ancestors, at any rate, erected shrines of which the most exalted Buddhists in Southern India might be proud. And, in point of artistic taste, the Chinese have never been, within a hundred degrees, the rivals of Japan. These latter, too, are apt to lavish more of their wealth and their idealism upon their private lives than upon public structures. They care little, as a rule, for palaces or temples, any more than they do for costumes or jewellery; but upon their houses they bestow an art resembling in its perfection and passion, though not in its materials, that which was bestowed by the men "designing like Titans, and working like jewellers," who reared the tombs of Delhi.

No traveller or visitor from Europe has ever laid open so clear a perspective of this far Eastern artistic life, or, indeed, history, as it may more properly be called, as this official statement or avowal. It tells us of a fortress, reared ages ago, when the arts of quarrying and of monumental structure were

known in Japan, of high castellated towers, of large "frigate-shaped" fortresses hewn from the quartz rock; and, still more singularly, of arched bridges, almost exactly similar to those of which the Dutch imported the plans from Amsterdam, and built at Kagosima. The Japanese models were 300 years more ancient than their supposed models in Holland. The Japanese gardens attached to these palatial residences may be passed by, as not taking any prominence in the Imperial Report; but a strong stress is laid upon the art of garden architecture; the dividing walls between gardens and terraces; the bridges over lakes; the descending steps from mansion-gates; the position and form of fountain-groups; and the contrast between these Asiatic Paradises and those of Europe, with which their conservators seem perfectly familiar, at Versailles, Rambouillet, and Fontainebleau, the erections of Louis XIV., Colbert, Bossuet, and Lenotre. Viewed as a whole, the architecture of Japan, as set forth and indicated by its professional admirers, is an attempt at conformity with the religion, the climate, the customs, and the character at large of the people; but, apart from this, the Imperial folio descends to smaller particulars. It confesses the deep and everlasting want of all Asiatic art; its utter powerlessness to represent the ideal of human beauty. It has no sense of colour in the highest and noblest sense; it does not recognise mankind in its most graceful movements, its most majestic attitudes, in the expressions which have been given to it in marble or bronze, by the classic natives. Here, we think, the Japanese writers have struck a true chord, perhaps by the assistance of an understanding other than their own. They have never seen men or women otherwise than in a condition of somnolence or slavery, of degrading labour, or luxury more degrading still, and they have never seen a specimen of humanity which could suggest to them other than the notion of a grotesque and ugly god. Their "graven image," in fact, is Buddha, a thousand times repeated, but it may be contended that they often drape him with a grace and vigour not commonly characteristic of Eastern art, in which the earliest models are always those which are most frequently copied. Again, as the Imperial Report admits, they have to represent the one mighty figure of their mythology in all variety of colours and shapes—to conform with the popular superstitions, to be grime, deformed, contorted, a faun or a satyr, a goblin or a hideous idol, precisely to suit the ignorance and the fanaticism of his worshippers. There are, we are told, in the temple of Go-Hiakir-Balkan, at Yeddo, no fewer than five hundred of those images all varying in their ugliness and their utter opposition to every thought of art, yet all assembled round a central altar, typifying the same genius, or power, of good or evil—all kings, saints, and martyrs in their turn, according to the avatars through which they have passed. Colour gives to them, perhaps, their principal characteristic. Excepting the few colossal Buddhas in stone and bronze, the statues are generally of gilded or lacquered wood. The flesh is painted in a rose tint; the gilding is splendid when it reaches the claws, eyes, and teeth of mythical animals, and the beards, where golden, are marvellously suggestive of original massiveness and abundance. This, indeed, is a light thrown upon both the old and the new Japanese arts such as they were never seen in before. But the illustrations in our Imperial folio do not end here. They set forth, also, a vast variety of anecdotes and fables in water-colours, representing soldiers on horseback and on foot, hunters in armour or naked, nobles and princes at Court, priests before backgrounds of gold, ecstasies going through artificial miseries similar to those represented on Egyptian tombs, animals

ascending scaffolds or hanging on gibbets, wretches undergoing torture, chimerical lions, leopards, and birds, and, as a surprise, iodes, lakelets, pavilions, bridges, a peacock on a terrace, and a lady with a fan. There is also the picture of a Japanese artist's studio with his models, his boxes of colours, his little coffers full of vegetable and mineral pigments, his fish-skin varnish, his circle of Chinese ink, his pen-shaped pencils, his brushes of the finest hair, his two palettes—the one small, the other large—with a hole made in each for the thumb, a northern light through the window, and the artist himself "steadying his right hand with his left to prevent it from trembling." All this should be of great and original interest in these days. We have, too, an historical sketch of the engraver's art, as it was probably practised in Japan long before it was familiar in China, with a singular series of copies from the block engravings of Japanese composers; but among the whole the native instinct for colour must be regarded as supreme, whether it is exhibited in mattings or in tapestry, in carpets or in cabinet work, in lacquer or in porcelain. Even in the tones and tints of their gilding and enamels the artists of Japan display a sweetness, so to speak, and a tender gradation which, as the self-enamoured artificers of King-te-Chin themselves—their rivals—confess, "is not excelled at Verres." We may perceive from this how closely the scientific industries of the East and the West are being brought together, and how close the competition between them is likely to become.

THE INSTITUTE PRIZE DESIGNS.

IN looking over the designs contributed for the Soane Medallion and the sum of £50 at Conduit-street, no judge of architectural drawings can fail to recognise in the design of "I Strive," a very clever work exhibiting considerable power and artistic feeling. In the plan of the building intended for Four Learned Societies, the blocks are ingeniously disposed symmetrically about a centre axis, and considerable skill is evinced in the outline and grouping of the parts, despite some obvious defects in detail. The buildings are comprised within a long quadrangle, there being three transverse and four side blocks, leaving two inner courts, which have been cleverly treated. The reading and writing-rooms are on the upper floor, and occupy the two main transverse buildings, each with its own entrance and staircase, while the ground floor is devoted to council room, secretary's and clerk's offices. The connecting side blocks are made the libraries, while the building in rear is the lecture theatre, T-shaped in plan, with the seats arranged curvilinearly, and with side entrances from the inner courts. We admire the manner the staircases, which form large circular-bayed ends towards the courts, are planned, but the lobby and entrances look ill-lighted on plan and the clerks' entrances somewhat tortuous. The arrangement on the first floor is much better: the landing and vestibule are architecturally managed, and the rooms are pleasingly broken by bays, which externally produce a very piquant grouping, especially towards the river frontage. There are two bays on each side of a centre archway or entrance, which last feature is somewhat elliptical in curve, bold in effect, and enriched with several members. Less to our taste is the side elevation; the centre hipped roof portion harmonises ill with the lateral bays of the libraries, which are carried up too high, and filled with an unmeaning kind of lozenge panelling in the gables. The details of the river front bay windows are particularly refined, and the author has followed in the lattice portion the French Renaissance of a type, it would seem, between

that of the 16th century and the Grand Monarque, though some of the details are incoherent enough to belong to that of Henry IV. The author of this design (W. R. Lethaby, Barnstaple) has been a frequent contributor to the BUILDING NEWS. The next meritorious design for this subject is "Acropolis." The author has chosen Classic, of the Greek Ionic type; the lecture-room forms the centre of quadrangle, round which and vestibule is a corridor, the offices and council-rooms surrounding the latter. We hardly like the tower, or attic, over hall—it has rather a crushing effect upon the portico in front, though its sides have boldly arched openings. The flank elevation and the details generally show knowledge of the style and some refinement, and the ink drawings are well executed. "Classic" is the motto of another attempt to compete for this prize. It is a classical composition with heavy pavilions at the corners crowned by domical roofs, a loggia of open arches being between. The architecture is of a somewhat "loud" kind—if we may use the phrase—and the drawing, though vigorous in parts, errs grievously, we notice, in the perspective of the columns. The necks to the capitals are drawn with so much curve as to become positively glaring. The loggia-arches are also defective in their curvature, and more pains would have been better bestowed upon these little matters. Some clever detail, but sadly wanting in scale, is shown in the lecture-hall detail. The author's upper plan is not without merits. The lecture-theatre is placed crosswise in centre of rectangle, and the reading-room and libraries occupy the angles and sides. "Spes" is another design, but in a feeble Gothic. Passing to the Grisell Medal designs for the construction of a stone dome over a drum of 40ft. diameter, Mr. G. H. Blagrove, of Southampton-row, wins the prize. The author's drawings are carefully worked out, and the constructive details are shown. We observe the author explains in full the "theory of stability," according to some of the best authorities—a practice we must certainly commend, as showing the candidate's knowledge of theory. One or two other designs for this very excellent prize are exhibited, but of a kind which only indicates the value of this recent addition to the Institute scholarships. The "Tite prize" does not go begging, but we should like to have seen a little larger display of good drawings. The year the prize was offered for a design for a building at the angle of two streets, combining a first-class shop, show-rooms on entresol and first-floor. Mr. C. E. Sayer, of Soho-square, carries off the honour. The design, if we cannot accord it high praise, is well drawn and shaded in India ink. It shows a circular corner domed above; the treatment does not strike us for its originality so much as its careful and moderate use of ordinary features. A space is left for furniture, and there is a spiral iron stair to the show-rooms. Another design, "Patentia et Spes," by Mr. H. A. Pelly, showing a refined treatment of elevation and some good detail, is recommended for medal of merit. Honourable mention is awarded to "Acanthus," by Mr. F. Edwards, of Manchester. On a first view, the elevation is commonplace, but the entresol is cleverly treated by a transom subordinated to the rusticated ground-story piers, which embrace both stories. The upper part of composition savours of tameness. "Italiano" and "Spes" are two other designs, but both wanting in knowledge and moderation in the use of ornament.

The Pugin's Travelling Studentship has fallen to a gentleman who, it must be said, gives evidence of both ability and perseverance though a comparatively new competitor for architectural honours. A glance at the drawings, hung and in portfolio, is enough to convince us of both of the above-men-

tioned qualities. Mr. Walter J. N. Millard is the successful candidate. His drawings and sketches in France and Belgium, chiefly in pencil, show a considerable capacity. We notice, for instance, his "Sketch-book Leaves," in which there are some charming scraps of buildings, such as Winchester Cathedral and the sketches showing that unique example of a Mediaeval fireplace at Netley Abbey. The design for a street front of ordinary dwelling-house shows a suitable brick treatment; but the most charming of Mr. Millard's sketches are his water-colours. The bits of natural scenery from Twickenham, Richmond Park, Selhurst, &c., are extremely clever studies of vigorous and honest handling in colour. The sketch of Chingford Church, with its rich yew-tree, is very truthful and clever; the round-headed tree in the sketch from Selhurst is also a capital study of foliage. In this work of art Mr. Frederick Hemings, who is awarded honourable mention, follows close to Mr. Millard, and both gentlemen have gone, it would seem, to the same fount of inspiration, and have been inspired with much the same feeling. The pencil sketches from Beauvais, Laon, Soissons, &c. are very interesting. In the same competition, Mr. J. Lansdell contributes some excellent and painstaking sketches in ink, showing considerable feeling and delicate handling. We refer to his sketches from Soissons and Laon, as examples. Mr. G. H. Raynor sends some very careful and creditable work; and Mr. J. Nixon Horsfield's drawings are clever, and we observe this gentleman is the recipient of the same studentship of the Manchester Architectural Society. We cannot omit to mention the excellent drawings from the Antique, sent by Mr. F. Miller—certainly more his forte than architectural drawing. We must also mention some capital pen-and-ink drawings by John B. Guss, a sketch of "Hall i' th' Wood," Bolton, a fine specimen of an ornamental timber house, recently illustrated in the BUILDING NEWS, and drawings of Glasgow Cathedral and Dryburgh Abbey, by James Lindsay. The Institute Silver Medal and £5 5s., for measured drawings, has been won by Mr. F. Pinches, of the Strand, for some carefully-executed drawings and details of Melrose Abbey, in which there is much feeling, though want of decision. Mr. Sidney Vacher, of Kennington Park, also obtains mention for his drawings of Lincoln Minster, showing a bay of the Angel choir, the drawings of which are rather spoilt by the bright colours used in the sectional parts, which rather detract from the work. There are some other drawings displaying considerable merit, to which we cannot here refer, though they are the work of students destined in a few years to take the place of their more experienced and fortunate competitors. Perhaps the misfortune in all these competitive contests is that of doing too much, if not in squandering valuable time on worthless examples, which, because they are old, are thought worthy of all the votary's labour. There are many instances of this want of judgment in the drawings under review, which occupy, in addition to the four walls of the Association lecture-room, three large screens and numerous portfolios.

THE SCOTTISH BROCHS AND THEIR ORIGIN.

IT is only fair that, having given, in a recent article, the gist of the arguments of Mr. Fergusson in reference to the origin of the Brochs in Northern Scotland, we should now lay before our archaeological readers Mr. Anderson's inferences; and we are the better able to do this from having received a reprint of that gentleman's paper from the "Proceedings of the Society of Antiquaries of Scotland." Mr. Fergusson

maintains, as we have shown, a Norwegian origin for the Brochs; while Mr. Anderson argues that these peculiar circular erections are Celtic, being allied in their structural peculiarities to Celtic monuments. Mr. Fergusson having recently challenged the full discussion of the subject, after Mr. Anderson's paper in the 5th volume of the "Archæologia Scotica" appeared, it is not unreasonable that Mr. Anderson should now desire to strengthen his theory. Mr. Anderson's paper is entitled "Notes on the Structure, Distribution, and Contents of the Brochs, with special reference to the question of their Celtic or Norwegian Origin." The author reviews the evidences derived from structural peculiarities, geographical range, and the contents of the Brochs; also their relation to other antiquities in the North of Scotland. It will be impossible here to devote the space necessary for a complete recapitulation of the arguments; so we shall confine ourselves to a brief *résumé* of the principal of them, leaving our readers to draw their own conclusions. We may observe, the paper is well illustrated—a view and plan of the Broch of Mousa, Shetland, with section, being given as a typical example. This is a circular tower, with hollow walls built of masonry laid dry, about 60 feet in diameter, and 50 feet high. Its wall, 15 feet thick, is solid for about 8 feet, above which it is hollow, the cavity being 3 feet wide between the two shells. This hollow space is crossed by slabs at about the height of a man, forming floors or galleries which run completely round except at the stairs, each gallery opening in front of the steps, its other end being closed by the back of staircase on the same level. An outer opening, the only one, is a narrow tunnel-like passage 15 feet long, 3 feet wide, and 5 to 6 feet high. The central area or well is surrounded by entrances to the chambers on ground floor. The section shows the tower to be a truncated cone, with a curved batter outside, pierced only by the narrow doorway; while inside the court low and narrow openings give access to the chambers and stairs, and a long vertical opening, divided by slabs, ladder-like in appearance, admit light and air to the galleries. The author defines the geographical limits of this typical structure, and gives a list of several which vary in dimension from 34ft. to 90ft. external diameter, and maintains (1) that no Brochs are found in Norway or in any of the Viking colonies, except Northern Scotland, though Brochs are found in the Celtic as well as in the Norwegian area of Scotland, (2) that no dry-built stone edifices are known in Norway, though such structures are characteristic of the Celtic, or early Christian period of Scotland and Ireland, (3) that there is not in Norway a single specimen of a vaulted roof of dry-built masonry in any ancient dwelling or tomb, though such roofs are characteristic of early Celtic structures. In answer to Mr. Fergusson's argument, that the Brochs were useless for offensive warfare, the author says "the warfare of this region was peculiar. It was an irregular, intermittent warfare—a succession of forays by marauding bands against which there could be no more effective system of defence than a multitude of safes which were burglar-proof, and big enough to contain the families' goods and cattle of the joint proprietors. But the peculiarity of Mr. Fergusson's theory is, that it obliges him to give the safes, to the burglars, and not to the people whose property was continually threatened." Referring to one structural objection raised by Mr. Fergusson, the author remarks:—"I cannot adduce more authoritative testimony to the fact that the Northmen of the Viking time (8th to 11th century) were unskilled in constructing edifices of stone than that of M. Nicolayson and M. Lorange," who maintain that it was not till the introduction of Christianity, or

the beginning of the 11th century, that lime and stone were employed, and therefore that the Northmen of the Viking time were still in their timber age. Mr. Anderson also says the Brochs are not all located in the sea margin, but are situated on inland lochs. In Caithness they mark the area of the best land, and in Sutherland are thickly planted in the fertile straths following the course of rivers, and far from the sea. Coming to the contents of the brochs, Mr. Anderson speaks with more authority. He observes: "If the brochs were built by the Norwegians, the relics found in them being the refuse of Viking life ought necessarily to correspond in character with the remains of the same period found in Norway and in the rest of the Viking colonies. Yet nothing is more certain than that this well-marked Norwegian group is not distinguishable among the extensive collections obtained from the Brochs, while nothing is more obvious than that the general *facies* of these collections from the brochs agrees completely with the remains of the late Celtic or post-Roman period from other parts of Scotland." Many engravings of an interesting kind are given to prove this conclusion, such as the long-handled comb (not unlike a human foot) found in the Brochs, but not found in Christiania or Stockholm Museums, whereas the characteristic Viking bowl-shaped brooch has not been found among the Broch relics. Various stone utensils, called "lamps" by the author, are figured, which he shows to be peculiarly Celtic. On the whole, the Broch relics are indeed poor—a character in keeping, it is affirmed, with the desperate struggle for existence which the Celts were maintaining. On the other hand, the author admits that relics of Norwegian origin have been found in connection with these Brochs, the result, he asserts, of a "secondary occupation" of them, indicated by certain internal and external constructions of a different kind of masonry from the original structures. Mr. Fergusson ignores these. We cannot, however, go further. Mr. Anderson next examines the structural antiquities associated with the Brochs, and concludes that the chambered cairns are earlier than the Brochs, and therefore cannot belong to the Viking time, and have no analogy with the tumuli of Norway. This portion of the paper is amply illustrated, and we refer the reader to it. The chief conclusions of the author are, that the Brochs are allied by their structural characteristics to the Celtic, and not to the Norwegian group of stone monuments, in which no instance of a vaulted chamber occurs; that the Norwegian remains from graves of the Viking period in Scotland agree with those in Norway; that the relics of the Brochs agree with the post-Roman relics of Celtic Scotland; and that the Viking origin of the other antiquities is not supported by satisfactory evidence.

THE HOLBORN UNION INFIRMARY, HIGHGATE.

IN an open space facing the Whittington Almshouses at Highgate, between Holloway-road and Hornsey-lane, an important group of buildings for the Holborn Union Infirmary has been erected from the designs of Mr. H. Saxon Snell, a bird's-eye view and plan of which we illustrate to-day. Mr. Snell, who has only partially adopted the pavilion principle of plan, has placed his main blocks to form three sides of an elongated quadrangle. From an inspection of the buildings, we must admit that the architect has well complied with the requirements of the Local Government Board, and that the wards are well separated and admit of easy administration, while the grouping of the blocks presents a dignified exterior to the main road. Two main blocks of wards of five stories in height, separated by a central

tower and staircases, compose the façade. The windows have been combined in vertical recesses between the piers, and are effectively pronounced by gabled heads which form the most pleasing feature of the elevations. These are built in stock brick, without coloured bands or other unnecessary ornamentation, and are characterised by an agreeable breadth of treatment. The lavatories, &c., are boldly pronounced features and terminate as towers which help to break the monotony of the masses.

As the plan we give will show, the hospital comprises a central block, which forms the principal façade, at the ends of which, though separated and communicating only by a covered corridor, are detached pavilions at right angles, and these form advancing wings in the main front. Parallel with and in front of the central block, and connected with it by the main centre entrance, are the officers' quarters. These are the principal blocks. To be more particular, we may say the central or main block forms two wings and centre, one wing devoted for male and the other for female patients. If we describe one of the wards comprised in a wing the whole of this block will be understood. Each ward, then, is 100 feet by 40 feet, will contain 50 beds, and is divided into five parallel compartments transversely to the main length or axis, each being pronounced by a bay window at the south-west side, so that externally on this front the elevation consists of a series of five bays to each wing which continue through all the stories. The advantages of these bays are obvious. They give an ample supply of light and air to the ward; they catch the sun, so invaluable as a curative agent, and they form a series of cosy and comfortable recesses for patients to sit in. Every bay is surrounded by a seat with sloped backs of pitch pine; in the centre will be a table, and the space thus set apart answers the purpose of a day-room to the group of patients in each compartment of ten beds. The beds are arranged in rows at right angles to the length of the compartments which are separated by dwarf walls about 5ft. high and iron columns. The sides opposite the bay windows have casements and hinged top lights. At the extreme end are three closets, a sink, bath, and lavatory, arranged with a ventilated lobby in the approved plan. At the other end, the centre of the whole block, is the staircase and nurses' room. Of the sanitary ventilating arrangements we can speak favourably. Fresh-air inlets are introduced at the end of every compartment; these will communicate with skirting-boxes having perforated zinc panels, and running under the beds, through which also a hot-water pipe runs. The outlet openings are at the sides of windows, are covered with perforated zinc, and communicate with flues in the piers of wall. Besides these there are ceiling channels at intervals which allow the vitiated air to escape by other flues in the walls on each side. In these channels are the pipes to carry off the products of combustion from the gas-burners, the latter being suspended with inverted cup-like receivers. As regards warming, in addition to the hot-water system, "Thermohydric Stoves" are placed between the bays, the flues of which are carried up the walls. The walls are plastered, the lower part in Keene's cement and coloured French grey and chocolate red below. Hydrants are provided on every floor, and linen-cupboards and nurses' scullery on the landings. The bay windows have sliding sashes. We may observe that the entrances to the several wards are by the staircases in centre, one to each sex, and that no opening occurs between except at the top landing, where a door for the convenience of the medical attendants is made. The main entrance under tower is a wide-arched corridor with receiving wards on each side. In the basement under the wards are stores

and officers' pay and mess-rooms arranged *en suite*. A lift is provided to the several wards, and the whole length of basement is traversed by a tramway which connects the end pavilions with the main block. Each end pavilion forms a long narrow block at right angles, as we have said, to the central one. At one end is a staircase and lift, nurses' room with plate rack and observation-window, and a small ward for four beds for special cases with its own conveniences; the other portion forms on each floor a ward for 28 beds, 84 feet by 24 feet, with windows on both sides and rows of beds in pairs. At the north-east end is a semi-detached projection or tower, comprising a sink and two closets, lavatory, &c., and having a lateral window for cross-ventilation. In each pavilion this forms a tower. The other ventilating details are the same as those described above, namely, inlets near floors with perforated zinc skirting boxes under the beds for the hot pipes, &c. We notice that the windows in these wards have casements as well as upper sliding sashes, and the architect has managed to secure sufficient depth of window-sill to obtain outer balconettes that may be used by patients. Two Thermhydic stoves are placed in the centre of each ward.

Between the end pavilions, and parallel to the central block, is a range of officers' quarters. These are connected by a central covered way. The doctor's residence forms the centre of the range, and comprises large reception-rooms and several bedrooms. A Board-room is provided over the entrance hall. The matron's and head nurse's rooms occupy the remainder of the wings, accommodation for 26 nurses being provided. The central tower is carried up and forms an imposing feature in the principal façade. In the upper story is a large iron tank 10 feet square and 10 feet deep, holding 6,500 gallons to be used entirely for working the lift. The roof is of slate, and forms a low spire. Ascending to the upper gallery, and getting through the dormers to the parapet, a splendid panoramic view is obtained of the north of London and the Highgate hills. We notice that all the roofs are covered with green "Eureka" slates, and have red tile hips and ridges, contrasting agreeably with the stock brickwork. The walls are relieved by Malin dressings and Beart's bricks in the copings, parapets, &c., stone being used as lintels. The chief effect is obtained by recessing the window bays, which are arched above, and break the roof as gables, the angles having a bold roll member of moulded brick. The parapets are pierced with vertical openings. We may add that the contractors are Messrs. J. Mowlem and Co., the engineering works having been carried out by the following firms:—The cooking apparatus by Messrs. Benham and Sons, the hot-water heating by May Bros., the lifts by Messrs. Potter and Sons, the gas by Messrs. Jeal Bros., and the w.c. apparatus by Mr. E. Howard. The works have been superintended for the contractors by Mr. W. C. Morey, Mr. Walter E. Blake having acted as clerk of works for the architect, Mr. H. Saxon Snell. We believe the entire cost of building will be about £80,000.

Many readers will feel flattered to hear that a daily journal considers the wedding-cake provided for the Duke of Connaught and his wife by a Windsor baker, "a very triumph of architectural skill and taste." We regret our space does not permit a reproduction of the description of the "structure," with its "vaulted roofs, supported by Corinthian columns," &c.

The Morley Clubhouse was opened at Nottingham on Friday evening. It is a large building situated at the corner of Shakespeare and Melbourne streets, and is of four stories, the ground floor being arranged as a café, with rooms for the Morley Club and Young Men's Christian Association above, and at the top a series of bedrooms. Mr. R. C. Sutton is the architect, and Messrs. Thomas Fish and Son are the builders.

HOUSEHOLD SANITARY ARRANGEMENTS.—IV.

IN his fourth Cantor Lecture on "Dwelling Houses: their Sanitary Construction and Arrangements," delivered on Monday evening at the Society of Arts, Dr. Corfield took up the subjects of filtration of water and dry systems of removing refuse matters. The process of purification of water by filtration was, he said, until recently misunderstood. For a long time it was thought that water, in passing through a pervious material, was simply mechanically strained to the extent of separating from it the grosser suspended particles. When it was noticed that some of the dissolved matters were eliminated from the filtered water, it was still supposed that these accumulated in the filter, and that they would in time choke it up. The action of a filter was, however, not only to strain the water, but so to subject it, when finely divided, to the action of the air, that organic matters, whether suspended or dissolved, were oxidised by it and changed from putrescible substances to minerals no longer liable to change, and incapable of affecting the health of those drinking them. These facts explained the reasons why filtration, to be thoroughly effective, should be both downward and intermittent—downward, because then the water descended by its own weight in minute streams, and was less likely to be forced through the porous material *en masse*, driving the air before it; and intermittent, to give time to the filtering substance to re-absorb air in place of that used during the purification of the water. A compensatory advantage of upward filtration was that when it was adopted there was some guarantee that all the water had actually passed through the filter. In illustration of the necessity for sharply looking after all household filters to insure that they were in good order and in use, Professor Corfield mentioned that a London medical man, who was very particular about sanitary matters, suspected that the filtration of his drinking-water was not so thorough as it ought to be. On examining his cisterns he found that the filter had been carefully adjusted so as to purify the water passing into the servants' water-closets, whereas the domestic supply for drinking purposes was not submitted to the process.

Having explained the principles of filtration by familiar illustrations, and referred to Dr. Frankland's experiments, the lecturer proceeded to describe a number of filters exhibited on the table. In those of the London Water Purifying Company the water passed upwards from the large cistern through pores in a vase; from thence it passes out at the top through a little cup full of holes, and so into pipes by which it is drawn off into the pipes upon the siphon principle. In these filters all the water used must have passed through the filter, and it would continue in action for an almost indefinite period.

Concerning the silicated carbon filter the opinion was pronounced that the filtering material was exceedingly good, not being liable to contain living organisms. For filtering purposes both animal and vegetable charcoal were employed. The latter material was very inferior—it not only gave off salts into the water but was less effective in straining the liquid. Animal charcoal was not always sufficiently burnt; and when any animal substance remained uncalcined in the centre of the cake of charcoal, it became a breeding-place for minute red worms. In using charcoal, therefore, it was necessary to see that it was of animal origin, and that it was thoroughly burnt. It ought to be frequently cleansed, and occasionally scraped. Sponge was often used, as it was an exceedingly unalterable substance; but it needed more frequent washing, or, better still, should be replaced at short intervals, as it harboured small worms. In too many filters, much of the water passed over the surface only of the porous material. The best forms of charcoal filter were those in which two blocks were used, the first acting as a strainer. A well-known charcoal filter was Atkins', known as the Admiralty pattern, of which several varieties were shown. In almost all filters the water should be run off every night, to allow of re-aëration. This must not be done with the spongy iron filters of Bischof, in which the material must always be kept under water. By means of diagrams and specimens, the action of these filters was ex-

plained, it being shown that the water entered the filter by a ball-cock arrangement, and passed down by a tube to near the bottom of the vase; it then rose through holes in a plate through the spongy iron, and was drawn off at the top. In passing through the iron the water took some of its particles up, and was, therefore, afterwards run through a layer of prepared sand. In order to aërate the water, it was next spouted through a minute hole, falling as spray into a pure-water reservoir. The principles of action of this filter were not yet clearly understood, but its results were the destruction of organic substances in a different manner to that effected by using either charcoal or sand. In the aërating filter of the Sanitary Engineering and Ventilating Company, the air that passed out of the pure-water chamber rose through the filtering material, and hence there was no need of the tube for the exit of air provided in almost all filters. In this filter, water passed into a loose vase, and through a cake of silicated carbon, being subsequently squirted upon other loose filtering material. The plate supporting this second mass, instead of being flat, as in ordinary filters, was raised in parts, with small holes both in the elevated and depressed portions, so that the air displaced by the water escaped through the higher portions of the plate. For use in a room, the common glass vase containing a cake of charcoal was suitable, as its perfect cleanliness could be seen at a glance. An improvement was a handle to the upper vase, so that when raised it did not drip. A good method for filtering rain-water, for use in country places, was that designed by Professor Rolleston, of Oxford. It was a tank divided into a large and small compartment, with a layer of filtering material passing through both divisions, and resting on a perforated frame. The rain-water was received near the bottom of the smaller compartment, and, rising through the filtering medium, flowed over the diaphragm into the large compartment, where, passing by gravitation through the second filter-bed, it flowed away. The water was thus subjected to both upward and downward filtration. A waste-pipe, to obviate overflow, was an essential to this filter.

The lecturer then passed on to his second topic, the removal of refuse from houses by "dry systems." "Dust" ought to be nothing but what its name imported, household dust and ashes; but, as a fact, all kinds of refuse found their way to the dust-bin, creating much nuisance. All organic refuse from the kitchen ought to be placed on the kitchen-fire at night, when it would help to light the fire in the morning, and would be inoffensive, as everyone could see by experiment. The difficulty of dealing with dust was a growing and an increasingly expensive one. A few years since, when it was largely used for brick-making, it was a valuable product, but now, contractors, instead of offering considerable sums for the privilege of removing it, required payment for taking it away. Thus, at Islington, the contractor a few years since offered £2,200 a year for the dust, and this year the accepted tender cost the parish £4,057. One of the first sanitary laws was that all refuse matter should be removed as speedily as possible, but owing to the expense of carting away a valueless material our dust-bins were emptied as seldom as possible without becoming an absolute nuisance. Where practicable, dust-bins should not be allowed to abut on the walls of a house, and in no case should a rain-water pipe be permitted to pass through them; much injury to health resulted from a combination of these errors. If the space was so limited that the bin must rest against the house, it should be well cemented to prevent the percolation of air through the walls, and a rain-tight cover (happily made compulsory in the metropolis) should be fitted to it. But he must pass on to speak upon our methods of treating excretal matters in, and their removal from, the house. The very name of these methods, "conservancy plans," was self-condemnatory, for the householder's aim should be to get rid of excretal and other refuse as speedily as possible. The first of these methods was by digging pits or cesspools in the adjacent ground, or even under the house, as a receptacle. When these were in fashion, it was thought so much the better if the soil were porous, for then the liquid matter would drain off, and they would need emptying the less often. The inevitable result was, that in loose soils the wells became contaminated, and cholera and typhoid and other fevers prevailed. Opinions changed, and cesspools were

afterwards made with impervious walls, so that the contents were kept in, a connection being sometimes made with a land drain or sewer. The last modification was yet largely practised in Paris for the sake of the manure; in that city, as visitors had seen, open-mouthed pipes passed from every floor to the cesspool, and as the only ventilation was by pipes to the roof level, the method was exceedingly offensive. In that city the receptacles were emptied by means of airtight carts, previously exhausted of air, and attached to the cesspool to suck up the contents—a practice no one who had observed it in operation would wish introduced into England. In many parts of this country the dust-heap was made the receptacle of all refuse, the liquids being absorbed by the ashes. In some towns these "middens" were of enormous size, as in Liverpool, and were even suffered to accumulate in the houses. Wherever they existed the mortality, especially amongst children, was very great. The improvements in these dry systems were always twofold, consisting—first, in making the receptacles smaller; and second, in rendering them impervious to water. The first alteration necessitated more frequent cleansing; the second insured that the refuse should be less liable to moisture—one of the essential conditions of decomposition. Cesspools were, as knowledge of sanitary laws increased, reduced to movable receptacles, as in many parts of France, and the liquids were allowed to pass off into drains and the solids removed, as in Cheshire's system. Pails and tubs were placed below the seats of closets, as at Edinburgh, Manchester, and Birmingham. The danger of these plans was that these foul substances were allowed to remain in the house too long. Such receptacles should have a spring lid, with indiarubber edges, to enable it to fit as tightly as possible. At Hull, a watertight receptacle was placed beneath each closet and periodically removed, and even this small improvement had led to a reduction in the death-rate of that town. Dr. Bayliss, medical officer of health for West Kent, had devised a shaft rising from the receptacle above the roof; the lecturer had examined instances of it in use, and considered it worked well in cottages. Morrell's self-acting cindersifting ash closet (of which a model was shown), had attached above and behind the closet a receptacle for cinders, of which the larger ones were retained in a sieve, and might be re-burnt. By the movement of the seat the ashes were sifted and fell into a hopper, being jerked upon the deposit when the seat rose, and so rendering it comparatively inoffensive. An undoubted advantage in this closet was that it separated the large cinders for re-use on the fire. The Goux system consisted of a double pail placed beneath the closet, having an absorbent material between the two pails. The dry-earth system was brought into prominent notice by the Rev. Henry Moule. He pointed out that dry earth formed a perfectly odourless compound with excretal matter, and that it could be used again and again if redried. For large communities, however, the system was perfectly impracticable. First there would be considerable difficulty in procuring in large towns a sufficient quantity of dry earth. Then there would be further difficulty in getting rid of the compost, owing to the fact—only admitted after considerable experiment—that it was not a valuable material manurally. The organic substances were so decomposed into their constituent carbonates and nitrates, some of the latter being probably given off as free nitrogen, that after the earth had been re-used six or seven times it possessed no greater agricultural value than ordinary garden mould. An insuperable objection was that in towns it would be liable to be used by careless persons, who would let slops and other liquid refuse mix with it, and so hasten decomposition, and the apparatus itself might get out of order. There was also the peril, the extent of which was yet unknown, that although the substances were deodorised they might not be disinfected, and so might propagate disease. The system was, however, the best for temporary collections of people, as at volunteer encampments or cattle shows, and might be used in isolated country houses. A similar system had been adopted for ages in China, and had been the means of enabling that land to maintain an enormous population without rendering the whole country barren. Professor Corfield announced, in closing his address, that in the next two lectures the water carriage systems of removal would be considered.

THE GREEK CHURCH AND THE NEW SYNAGOGUE AT BAYSWATER.

TWO buildings remarkable for their design are now in progress and near completion within a short distance of each other in Petersburg-place, Bayswater. One is the new Greek church, from the design of Mr. John Oldrid Scott, of which we gave a perspective view and plan, p. 442, Vol. XXX., and the other is a new synagogue from the joint design of Messrs. W. and G. Audsley, of Liverpool, and Mr. N. S. Joseph, of Coleman-street, also illustrated in the *BUILDING NEWS*, Vol. XXXIII., page 28. As representing two important religious communities, and as typical in architectural style of their respective tenets, we consider them as calling for a more than ordinary notice. Mr. J. O. Scott, in the Greek church, true to the traditions of the ritual, has taken the Greek cross as the form of the plan, three short arms and the apsidal chancel end. The western arm or transept has a narthex along its whole width and two entrances. The Byzantine style has been adopted, the centre area being covered by a dome of the same diameter as the transepts' width—namely, 42ft. The illustration which we gave will convey a good idea of the general effect and massing, though we remark a few deviations from the plan and design. One is the omission of the columns in the north and south transepts, and the dome is pierced not by triple dormers as shown, but by a regular series of equi-distant openings round the base. Externally the walls are of stock brick, relieved by bands of red brick, stone being introduced with red brick in the voussoirs of the arches. The narthex towards Petersburg-place has entrances at each end, the square-headed architraves of which are of polished granite boldly moulded, above which the semicircular arches divided by stone pillars. Above the central portion of the narthex, a gabled projection from the main wall of transept is built, forming a gallery lighted by a large circular-headed window, divided into four lights by square stone pillars, which are carried through a moulded transom to the arch-head. Above the two doorways domical roofs are formed in the angular recesses. These and the central dome are covered with lead laid in ribs. The external effect, it is needless to say, is somewhat heavy and lumpy, characteristic of all buildings of the Byzantine cupola class. Interiorly, although yet without the marble casing and coloured decoration to the domical surfaces and lateral vaults, the effect must be pronounced satisfactory. The dome rising from four wide arches that span the transepts, the central piers of Shap granite, and the broad wall surfaces produce a majestic ensemble. Each of the transepts is 42ft. in width, and is vaulted in concrete, while the eastern end is triapsal, divided by massive marble-cased pillars, the central bay being the widest. These are arched below, a circular relieving arch spanning the whole width of chancel, composed of voussoirs of alternate stone and red brick. Four pendentives fill the arch spandrels, above which is a circular cornice of terra-cotta, and five feet height of drum, from which the dome springs. The lower portion of cupola is of brickwork, a brick and a half in thickness; above it the cupola is constructed entirely of concrete, of hemispherical section, varying from 1ft. 2in. to 9in. at the crown, with an internal diameter of 42ft. Narrow openings pierce the dome round the lower part, and the whole inner surface is now simply plastered. The cupola was constructed on a ribbed centreing, and is surrounded at the haunches by a band of iron on the outside. Boxed girders are introduced across the angles within the pendentives, and the latter are further strengthened by iron bolts in the thickness of brickwork at angles. The whole forms, in fact, a solid, homogeneous and compact shell of brick and concrete, not the slightest apparent fracture being noticeable. We observe iron ties are introduced at the springing of the main arches, though these are hardly necessary for further security, now the work has become solidified. It may be mentioned that there is no outer roof or covering, the outer dome becoming at once the inner cupola or vault. The circular-ended apses have also semi-cupolas over them, and in the centre one a cartoon of Our Saviour has been placed on a gold ground. Of course, it is intended to adorn the main cupola and pendentives with frescoes; but we hear the

designs for these have not been settled. The four main piers, with their angular breaks, are encased with a rich dark green marble, and have bands of a black-veined marble at intervals. The walls are to be lined with marble slabs, and black vitrified brick courses project at irregular intervals of height for this purpose. The arches have alternate voussoirs of red brick and stone, and the capitals to angle piers are carved in Bath stone, their design being very similar to the caps of the main order at Sta. Sophia, Constantinople, from which, evidently, the outline, volutes and leafage have been inspired. Red terra-cotta abaci are above the caps, and we may remark that the whole of the terra-cotta enrichments are highly creditable to the manufacturers—the "Architectural Terra-Cotta Company." The chancel is raised three steps, these being of light marble. The altar of brick, encased in marble, stands in middle of the centre apse. An elaborate and carved wood-screen is to be erected across the chancel. In conformity with the usage of the Greek church, which forbids instrumental music, a singing gallery of slight projection is erected in the north transept, and we had the satisfaction of noticing the acoustic merits of the building by listening to the vocal powers of a gentleman who sang from this point. The transepts will be seated, the other portion of floor being paved with marble. Light is obtained by narrow semi-circular windows in the sides of transepts and by circular wheel-windows of terra-cotta in the gables. There is a large vestry and a lecture room below the south transept. We can only add that Messrs. Kirk and Randall, of Woolwich, are the contractors, Mr. Leake the foreman, and Mr. Leigh the clerk of works, the cost being estimated at about £15,000.

The new synagogue has a wide frontage to Petersburg-place, and is about 100ft. in length. The principal front—a view of which we gave—is of red brick with Mansfield stone dressings, and the architects—Messrs. Audsley and Joseph—have selected a style between Saracenic and Byzantine, if we are to judge by the details; the authors call it Græco-Byzantine. The main features of the front are—a richly-recessed arched doorway, subdivided by a shaft into two, in the arch of which is a sexfoil panel with the Decalogue inscribed; a large and elaborate traceried wheel-window, deeply recessed under a cusped arch, and a low gable with pierced parapet, flanked by turrets of minaret proportions, having cupolas of pointed shape. On each side is a low wing forming the ends of vestibule and the staircases. The vestibule is adorned by clusters of stone pillars, and have staircases at each end leading to the galleries. Passing the inner doors the interior presents a church-like appearance, having a nave and two aisles with galleries. The former has a clerestory of circular windows, and is covered with a plaster vault, ribbed and pointed. At the east end is an apse-like recess filled by a costly shrine of alabaster and marble, richly overlaid with gold, standing upon a raised marble platform of several steps. It is intended as the ark (*aron hakkodesh*), above which is the choristers' gallery, hidden behind the gilt cupolas which crown the ark. The platform or reading-desk at the west end of nave is also of variegated marbles, profusely gilded in the caps, &c. Over the choristers' gallery in apse is a large wheel-window, corresponding with that at west end, filled with stained glass. The side galleries are supported on massive octagon pillars of iron, which above the gallery fronts have very deep capitals east in plaster and intended for decoration. Above these spring moulded and enriched arches, of pointed horseshoe form, carrying the clerestory walls. The fronts of galleries are divided by small square black marble shafts with caps into narrow panels of very rich grained pitch pine polished, the effect of which resembles a fine yellow-toned marble. The seats, doors, and fittings are of the same material, simply varnished. As customary in the Jewish synagogues, the women are separated from the men, the galleries being set apart for the former. Throughout the workmanship is of excellent quality, and the walls are finished, of a cream colour. We notice some chastely-designed brass pendant gas burners, suspended from brackets in the spandrels of arches, and the whole of the fittings display considerable taste. The passages are laid with mosaic. The synagogue will hold 900 worshippers. Mr. Adamson, of Hammersmith, is the contractor.

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ILLUSTRATIONS.

CHICHESTER CATHEDRAL AND THE CHURCH OF ST. JULIEN
LE PAUVRE, PARIS—HOLBORN UNION INFIRMARY, HIGHGATE
—ART UNION OF LONDON, NEW PREMISES—GROUP OF
THREE COTTAGES.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ILLUSTRATIONS FROM SIR GILBERT SCOTT'S "LECTURES ON MEDIEVAL ARCHITECTURE."

By permission of Mr. Murray, we present our readers this week with a double-page of illustrations culled from Sir Gilbert Scott's recently published "Lectures on Medieval Architecture," lately noticed by us. The principal example we give shows the eastern portion of Chichester Cathedral, one of the most beautiful instances of the Transition referred to in the author's third lecture. In a footnote Sir Gilbert Scott observes: "This work at Chichester was executed at the close of the [12th] century, after the fire of 1186, but Professor Willis has shown that some early pointed work of a very marked character, which exists in the western part of the Lady Chapel, must have been erected previously to that event." It is one of the finest illustrations in the book, and it will enable our readers to judge of the accuracy and faithful renderings of the originals by Mr. W. S. Weatherley, who has kindly placed them at our disposal. We may observe, *en passant*, in relation to this work—though not without some regret—that the archway at the end of nave has been lately closed by an elaborate reredos, from the design of Messrs. Slater and Ingelow, and that a reredos is in progress for the Lady Chapel, the execution of which has been entrusted to Messrs. Farnner and Brindley.

Our other photo-lithos illustrate the little Church of St. Julien le Pauvre, Paris, now the chapel of the Hôtel Dieu. This work Sir Gilbert Scott gives as one of a typical series of Medieval remains of great value. Speaking of this example in his eighth lecture he observes, "The choir and its aisles form a perfect work on a very small scale, in the Transitional style, with Byzantine foliage." The church is but little known, but is well worthy of attention. It shows how mistaken is the idea that the Early French style is not suited to small buildings. The clear width of the side bays is actually under 4ft., and the other dimensions in proportion, yet the whole not only has not a miniature but has a decidedly dignified air, while its details offer considerable varieties, even the two apsidal chapels being wholly different in their design and plan. What remains of the nave and the fragments of the fine western portal are good specimens of the succeeding style. Our illustrations show views of choir, the south aisle, and south chapel, the drawings of which have been made by Mr. Weatherley, from Sir Gilbert Scott's own sketches, the plan being from his measured dimensions.

THE HOLBORN UNION INFIRMARY, HIGHGATE.

A FULL description of this building will be found in an article on p. 269.

ART UNION FOR LONDON—NEW PREMISES, 112, STRAND.

THE week before last we published the plans and general elevation of this new building, and last week we gave a sheet of details of the upper portion of the front. To-day some further details are given, illustrating the principal story, or first-floor facade. The balustrade shown in the upper part of our plate to-day is as originally intended; the executed work at this point is more correctly given in our sheet of last week. In other respects our illustration published herewith represents the parts as now finished. A full description of the building will be found with the plans above referred to. Shortly, we hope to give enlarged details of the earving, which is exceptionally good. Professor E. M. Barry, R.A., is the architect. The execution of the whole of the scagliola marble columns and pilasters has been placed by the architect in the hands of Messrs. Bellman and Ivey, of Wigmore-street, W.

GROUP OF THREE COTTAGES.—"BUILDING NEWS" DESIGNING CLUB.

THE design by "Yesram" for a group of three cottages, which we publish to-day, was placed first in the competition, though other designs ran "Yesram" rather close in the race. The plan, according to our conditions, provides for one cottage to have six rooms, and two cottages with four rooms each, an arrangement frequently required, though perhaps not so often conveniently planned. "Yesram" estimates the cost of his plan at 6d. per foot cube, giving a price of £582 for the main block, and £106 for the outbuildings, making a total of £688.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the special meeting held on Monday last, the President announced that the Prince of Wales had consented to dine with the members on the 26th of April.

It was next announced that the Council had determined to recommend for the award of the Royal Gold Medal the name of Count Melchior de Vögne, whose archaeological works, according to Mr. James Fergusson, "add more to the knowledge of the architecture and archaeology of Syria than any that have ever been published."

The following recommendations of the Council respecting the award of medals and prizes for the current session were communicated to the meeting by the President:—

Soane Medallion:—Four sets of drawings submitted under the mottoes respectively of "Acropolis," "Classic," "I strive," and "Spes"; Soane Medallion, with the sum of £50, awarded to the author of the drawings distinguished by the motto "I strive," William R. Lethaby (age 22), Eberly Lawn, Barnstable.

Sir William Tite's Prize of £30:—Six sets of drawings submitted under the mottoes respectively of "Acanthus," "Antipodes," "Green Margins," "Italiano," "Patience et Spes," and "Spes"; prize awarded to the author of the drawings submitted under the motto "Green Margins," C. E. Sayer, 17, Soho-square, W.; Medal of Merit awarded to the author of the drawing distinguished by the motto "Patience et Spes," Herbert Alexander Pelly, Morden, near Mitcham, Surrey; Certificate of Honourable Mention awarded to the author of the drawings distinguished by the motto "Acanthus," Frederic Edwards, Queen's Chambers, John Dalton-street, Manchester. Grissell Gold Medal.—Four sets of drawings submitted for this Medal, under the mottoes respectively of "Alpha," "Between Whiles," "Cruz," and "Dulce Domum"; Medal awarded to the author of the drawings submitted under the motto "Dulce Domum," G. H. Blagrove, 84, Southampton-row, W.C. Institute Silver Medal (with five guineas): Drawings.—Five sets of drawings submitted, under the mottoes respectively of "Architecture," "Ars longa," "If I don't get it I'll try till I do," "Labor," and "Thorn"; Medal, with the sum of five guineas, awarded to the author of the drawings distinguished by the motto "Labor," Frederick Pinches, 359, Strand, W.C. Certificate of Honourable Mention awarded to the author of the drawings distinguished by the motto "Architecture," Sydney Vacher, 7, Stanley-crescent, Kensington Park, W.

Institute Silver Medal: Essays.—The President announced that not a single essay had been sent in, and that last year the same thing had occurred. The competition was open to all members of the profession without limitation as to age, and the subject of the essay set for the current session was

"The Architecture of London in the 16th, 17th, and 18th Centuries." It was much to be regretted that so little interest seemed to be taken by the younger men in the literature of their art. Prof. Kerr, *Fellow*, suggested whether something could not be done to stimulate the production of essays, in which they had been lamentably deficient. He only recollected one really good essay that had been sent in, but that did not get a prize, though he and Professor Lewis voted in favour of it. He thought a fair amount of money prize would stimulate work in that direction. To prepare an essay on the architecture of London in the 16th, 17th, and 18th centuries was a work which merited a greater acknowledgment than a medal of merit. Any number of medals of merit might be granted. There were young members of the Institute who could write well, as was evident from the columns of the BUILDING NEWS. When he (the Professor) was on the Council—if one was at liberty to say, after the changes of 1887, that one had ever been on the Council—the idea was entertained that some stimulus might be given for the production of essays of the high character which prevailed in the Institution of Civil Engineers, which were for the most part productions of high merit. He would suggest that the Council should take the question of the essays into their consideration. The discussion closed with an assurance from the President that the Council would give the matter their serious consideration.

COMPETITION.

BUSHEY.—The Building Committee have selected the designs submitted by Messrs. Coe and Robinson, in competition for the erection of a new church at Bushey, Herts. Five designs were submitted and noticed by us on p. 237.

CHIPS.

The Board of Trade have reported to the House of Commons that a provisional order has been made sanctioning the construction of a new pier at Ramsgate, commencing near the entrance to the "Etablissement," and extending seaward for about 600ft.; also for a pier at Westgate, extending from the cliff seaward for about 1,000 yards; also that provisional orders have been, or will be, made for a floating-dock at Penzance, and for piers, quays, sea-walls, or other harbour works at Cromarty, Fortrose, Lybster, St. Anne's (Lytham), Skegness, Strachur (Loch Fyne), Totland Bay, and Whitehall, Stronsay.

Mr. Hodgson, a builder, of Malton, lost his life on Saturday through his own imprudence. His workmen had been turning an arch over a wine-cellar, and completed the work on Friday night. On Saturday morning Mr. Hodgson ordered them to remove the centring and supports, but they refused, considering that the masonry was not set. He then proceeded to knock away the woodwork himself, when the mass fell upon him, breaking his neck.

It is proposed to erect a new church in the north-east district of Penzance, in the Penrose-terrace. The idea is to erect a church for 600 persons at a cost of about £5,000, and large subscriptions have been promised towards this sum.

The Stapleford School Board are about to build new schools in three departments for 330 children, from the designs of Mr. R. C. Sutton, architect, of Nottingham.

The museum buildings at Elgin are about to be enlarged from plans prepared by Mr. George Melven, architect, of that city.

The Romford School Board have approved plans prepared by Mr. Hudson, their architect, for new class-rooms.

The district of Attofts, in the West Riding of Yorkshire, is about to be supplied with water in accordance with a scheme proposed by Mr. Lumley, C.E., of Wakefield.

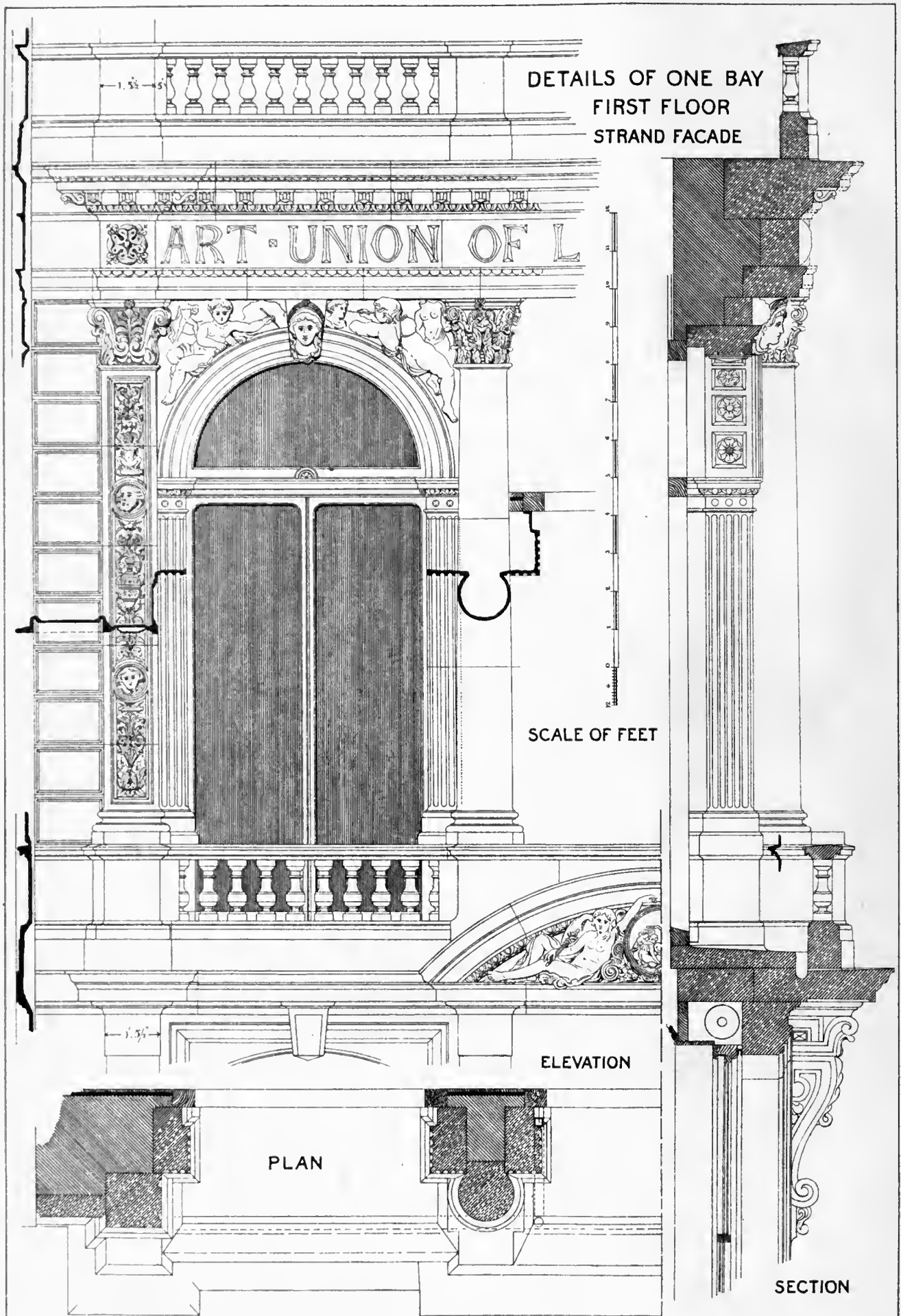
The Town Council of Bradford, Yorkshire, have appointed Mr. J. H. Cox as borough surveyor at a salary of £500 a year.

Dr. Page, Professor of Geology at Durham University, and a voluminous writer on geology and the physical sciences, died at his residence, Newcastle-on-Tyne, on Sunday, aged 64.

Mr. John Sutcliffe has been appointed architect by the Todmorden School Board for new schools about to be erected at Vale, near the town.

The Croydon Local Board have declined an offer from the West Kent Sewerage Board to grant the town an outfall through their sewers on payment of 8d. in the pound on the rateable value of the entire district, and at the same meeting decided to proceed with the drainage of Coulsdon.

A new line of railway in South Nottinghamshire, and constructed for the Great Northern and London and North Western Railway Companies, is about to be opened for traffic. Messrs. Logan and Henningway were the contractors.



ART UNION FOR LONDON NEW PREMISES 112 STRAND Prof. E. M. BARRY R.A. ARCHITECT

W. J. ADAMS DEL.

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

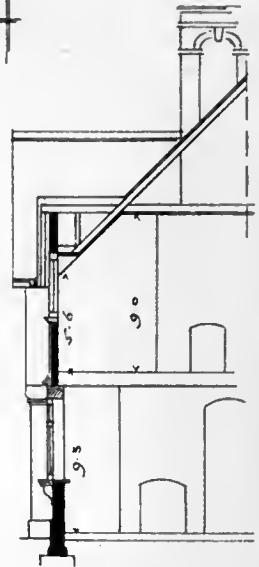
Group of Three Cottages

Building News
Designing Club.

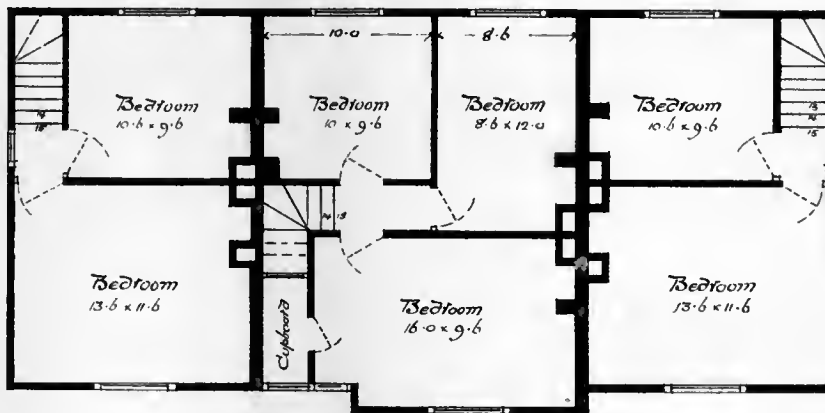
"Yestam"
Feb. 1879



Front



Section



Bedroom Plan

Estimate
Main Block 23302 sq ft = 582
Outbuildings 4254 sq ft = 106
£688

SELECTED DESIGN



Ground Plan

0 2 4 6 8 10 12 14 16 18 20
Scale of Feet

ROYAL ACADEMY LECTURES ON
ARCHITECTURE.THIRD PERIOD OF RENAISSANCE.—PALLADIO AND
VIGNOLA.

PROFESSOR E. M. BARRY brought his series of lectures to the students of the Academy to a close, for the present session, on Monday evening, by an address in which he reviewed the final development and decay of the Italian Renaissance, and, having glanced at the development of Italian architecture to which this year's course of lectures has been devoted, the question of the possible further revival and growth of the Renaissance was considered.

Thus far, said the lecturer, we have traced the progress of the restored taste for antique architecture in Italy up to the time of Bramante and Sansovino. This has been called the Golden Age of the movement; and if the latter be divided into three periods, we shall find it ranking as the second, or middle stage. The first period was Transitional, a time of fusion, when the architecture was subordinated to the decoration. The second period carried the revival of old forms a step further, and broke more decidedly with Gothic precedents. Its architects studied Roman principles of construction as well as Roman types of design. Brunelleschi's dome at Florence was the first fruit of the process, which led to the triumph of Michael Angelo at St. Peter's. Bramante and Sansovino applied Roman architecture to modern wants, with a success never since exceeded. Not only did they adopt the columns, pilasters, and entablatures of the Roman orders, but they sought also in the details of their works to resuscitate the old Classic spirit. Their time has, therefore, been appropriately called the Roman period of the Renaissance. But Bramante did not live to perfect his plans for St. Peter's, and the completion of this great work by Michael Angelo marks the time when the second period of Roman vigour was giving place to a more formal accuracy and a pedantic precision. Simplicity of general design, with a colossal largeness of detail, were the principles which suited the impatient nature of Michael Angelo; and they are illustrated by his abandonment of Bramante's plan in favour of a Greek cross, and by the introduction of a huge order, with the consequent exaggeration of subsidiary details, which detract so greatly from the effect and apparent size of the building, as we now see it. It was probably a reaction against an exaggeration only tolerable when directed by genius, which led to the colder and more tranquil designs of the later Renaissance. Architecture, which, at the revival of letters, had followed scholarship, still felt the same influence. The first burst of enthusiasm had been succeeded by knowledge; and knowledge was now giving rise to a critical pedantry. False quantities were as much condemned in the architecture as in the poetry of the day. The effects of a spirit of inquiry were visible, not in art alone, but also in religion and manners. The trustful spirit of olden days had given place to a disposition to touch, taste, and handle. When the canons of taste in architecture had been established, no appeal could be allowed. The instinctive and undisciplined aspirations of the many were to be repressed by the classical fastidiousness of the cultured few, who, on their part, were bound to be able to produce, when challenged, chapter and verse for their decisions. The problem to be solved was to recall the past,—to ignore the present,—to bring back the dead to life. Can we wonder if the later Renaissance architect failed at so hopeless a task? Nevertheless, we too have our own revivals, and perhaps may even now be told, "*De te fabula narratur*."

The application of the spirit pervading society at this time to architectural design was chiefly illustrated by the works of Palladio, of Vicenza. He gave, indeed, a name to the architecture which he used, and we have not ceased to speak of the Palladian style, although the term has come to be used with some inaccuracy and much elasticity of meaning. By "Palladian architecture," it is not generally meant to refer to the architectural forms which Palladio himself actually used, but rather to Italian architecture generally. Palladio's school referred every detail to precedent, and considered that the limits of invention had been reached. Vitruvius had described the edifices of the Augustan age, and his writings were now eagerly studied as a very gospel of architecture. The proportions he laid down, and the precepts he

inculcated, were to dictate to architects for all time the principles on which alone their art must be based. Palladio's principal works are to be found at Vicenza, of which place he was a native. His best design was certainly the arcades of the Town-hall—a building which, notwithstanding admitted defects, has a charming effect of proportion, and of light and shade. A peculiarity of his designs is found in a weak treatment of the angles. Notwithstanding this defect, however, Palladio's designs are usually well-studied. The fame he obtained was chiefly owing to his eye for proportion, while the distribution of the parts give a pleasing character to his buildings generally. Vignola and Scamozzi are generally ranked with Palladio as members of the same school, and its pedantry is more to be attributed to their followers than to those distinguished architects themselves. Still it is evident that if they had regarded the arbitrary proportions of the Classic orders with less reverence, their talents might have carried the Renaissance to a further and more successful development. This, unfortunately, was not the case, and the rules which were to achieve perfection served to stifle art. The buildings of the post-Palladian school were incapable of exciting enthusiasm, and can at best be regarded as careful academic studies. As time went on, men spurned the fetters sought to be imposed upon them, and rushed into the excesses of exaggerated detail, known by the name of "Rococo." The Renaissance was nothing if not progressive, and the ultra-classic formality which now reigned supreme was the herald of decay. We may perhaps learn from this the truth that no selection of a past style of art, and no mere careful reproduction of its details, will ultimately satisfy a society which has little in common with those for whose needs such architecture was originally invented and used.

Vignola's greatest work was the noble Palace of Caprarola, near Rome, a building simple in plan, and so treated as to present a castellated, rather than a domestic, aspect. The design is graceful, with a double order, and a well-proportioned arcade to the entrance-front. The weakness of the angles, noticed in Palladio's designs, is here avoided. The plan is a pentagon, with a circular court within, and was evidently controlled by military considerations. The building is a fine specimen of Vignola's talents, and, with a few additions, would be a grand architectural monument. The pentagonal form, however, is not agreeable, as the angles caused by it present an awkward appearance, and the castellated treatment of the plan is not adequately carried out in the external design. The elevation of each side of the pentagon is that of a palace, and in the details the military character is also together absent. The latter might have been preserved, and the place greatly strengthened, if the angles of the pentagon had been marked by towers, projecting so as to command the flanks, and carried up, so as to break the monotonous line of roof. If this had been done, and the central circular court covered by a domed roof, the building might have been rendered far more effective architecturally than at present. Vignola was more Palladian than Palladio in his exact reference to ancient Classical rules. His treatise on the Five Orders aims at the authority of a text-book, and is still, in that sense, deserving of study. He did not give the proportions of any actually existing details, but by a principle of selection, he sought perfection in the survival of the fittest, and thought to weld the whole together into one harmonious system. He was invited by Philip II. of Spain to superintend the erection of the Escorial, for which many designs had been obtained from various architects, but declined the invitation. On the death of Michael Angelo he became for a short time the architect of St. Peter's, in which capacity he designed and erected the two lateral cupolas of the building. His works rank on equal terms with those of Palladio; and, indeed, in elegance of detail may be held to surpass them. He had no inconsiderable talent as a painter, particularly of perspective, and used to say that a study of the latter science had led him to adopt architecture as his profession. Vignola visited France, and remained there about two years, which probably accounts for the tradition that he designed the Chateau de Chambord. This could scarcely, however, have been the case, as the building was commenced before the time of his visit, and certainly does not accord with his usual principles of design.

It is more possible that he had something to do with the designing of the palace at Fontainebleau; its general appearance is more consistent with Vignola's architectural principles, although the details are not to be compared with those of his best works in Italy. At the time of Vignola's death in 1573, Palladio was nearly at the end of his career; but his traditions were, for a time, upheld by Scamozzi, a young man then rising into fame. He, too, was a native of Vicenza. He settled in Venice, and took up the work of Sansovino and others. He continued the design of the Library round the south side of the Piazza of St. Mark, adding a third order, and altering the deep frieze and cornice of Sansovino. These were not improvements, and his work wants dignity and interest. Like other architects of his time, he also turned his attention to military engineering, and laid out the fortress of Palma, near Friuli. In this he used the forms of the Renaissance, and gave them a peculiarity of character, by the use of simple rustication. For the massive walls of fortifications such a treatment sufficed; in such cases delicate mouldings, and such details, would have been out of place and unnecessary; but for the gateways, the architects of the Renaissance adopted somewhat more elaborate designs. The device of rustication was freely employed by the later Renaissance architects, but always in subordination to the general effect, and not after the lavish fashion of the old Florentine school. The Palladian architects usually rusticated portions of their buildings only, preferring such parts as seemed to require additional strength, as the ground or basement stories. Vignola did this at Caprarola, and he also carried up rusticated quoins, at the angles of the projections of the upper story. This system of marking the courses has been generally adopted in revived Renaissance architecture in all countries. Wren used it at St. Paul's, and Inigo Jones at Whitehall, and the characteristic Water-gate of the latter in the Savoy is a pleasing specimen of the military type, similar to that adopted by San Michele. In Italy, the use, in Mediaeval times, of voussiors to the arches, of different colours, had an effect nearly related to rustication; and a similar method was common in Byzantine and Eastern work. Of late years, it has been customary to condemn rustication, and it is no doubt liable to abuse. It has, however, when used to emphasise actual masonry joints, an appropriateness in many situations, and may be used by an architect so as to give scale to his work, and to modify the monotonous effect of too much plain surface. An example may be seen at Bridge-water House, particularly in the part facing the Green Park. The rustication of this front is applied to the ground floor only, over the surface of the wall, and at the angles of the projections above, and we feel that it is both reasonable and effective.

With Palladio, Vignola, and their followers, we terminate our examination of the architectural Renaissance of Italy. It has been said that Vignola, by his treatise on Proportions, and Palladio, by his prescription of strict regulations, would have made of architecture an exact science, in which precise knowledge might render success certain. This is, however, very far from fair, as is proved by the examination of Palladio's own works. True, he aimed at precision in his application of the orders; but there is much variety in his different designs, and his details were usually refined. His palaces at Vicenza have served as models to the architects of most civilised countries, and they have survived the attacks of unsparing criticism. We realise more fully the merits of Palladio when we contrast his measured and studied compositions with the reckless and bizarre specimens of tricky designs which followed in the fantastic reaction of later days. In Palladio's buildings we find occasionally the mistake of enormous details misapplied, as at the Valmarina Palace; but in other instances an order was used to each story, with details properly subordinated. Propriety of detail and proportion had given a fame to Palladio which would not have been gained by the picturesqueness of his designs, or the fertility of his inventive genius. His style has influenced the revival of Classical architecture throughout modern Europe, including this country. Wren, Jones, Vanbrugh, with many others, have followed more or less Palladian precedents, and Somerset House, by Sir W. Chambers, is just such a building as might have been erected by Palladio or Vignola.

The use of Classical architecture is still common, although its progress has been checked by the Gothic Revival. The architecture evolved from the principles of Ancient Greece and Rome has been denounced, we know, as inadmissible, and stigmatised as Pagan. An active spirit of theological revival has led to the restoration of our churches in the old Gothic styles in which they were erected. Eloquence of critical disquisition has occupied itself with declaring the Renaissance an unholy thing; an evil spirit to be exorcised; a fault to be purged by a return to the straighter and better ways of Mediaevalism. The choice of a style might almost seem to be a question of morality, rather than of architecture. In deciding such a question, it must be remembered that a complete revival cannot but be impossible, whether of the architecture or of the spirit of the past. The world moves onward while we argue, and each generation has its own requirements. We may copy Greek temples, but we cannot be as the Greeks were, or think their thoughts. Neither can we revive the Mediaeval spirit by clothing our architecture in a Gothic garb. It cannot be admitted that limits are to be placed to the adoption by mankind of the extension of their powers by the increase of knowledge. To be for ever protesting against the things of to-day is a profitless, as well as an easy task. Some critics think the present always bad; their artists always failures; their own country always wrong. This is not a spirit which is likely to lead to healthy development in architecture. If we cannot recall the past, it does not follow that we may not be gainers by its experience, and thus take a new departure. We may fairly profit by its achievements, and draw precedents from its treasures. Hence we have the responsibility of choice of style placed upon us. It is, therefore, not reasonable that we should be forced to select one type, and use it for all purposes, merely because our predecessors did so, in ignorance of any other. Still less can it be contended, that we are not at liberty to avail ourselves of successive phases of the same style, because such a course is inconsistent with chronological accuracy. It is not the business of the modern architect to erect buildings which may deceive his successors as to the date of their execution.

We claim the liberty to select different architectural types for different things: thus, to some of us, the Gothic style may appear the most suited for churches and sacred buildings; and the Italian more appropriate to secular work. The first of these decisions has already been accepted, for the present, at least, in this country, and Gothic architecture has been practically adopted for church building. But while recognising the existing preference for Mediaeval architecture for ecclesiastical works, it cannot be allowed that the Classical style should of necessity be neglected. The Palladian school of architects had a definite intention, which was to design a modern style, that should be based upon the architecture of the Romans. Whatever merit may be assigned to their works, they certainly produced buildings unlike any that had previously existed. They copied, or intended to copy, literally, the details of the orders; but neither Palladio's arcades or Sansovino's palaces are direct reproductions of actual buildings. They, at least, succeeded in applying ancient art to modern use, in a manner which has been imitated ever since. We have had, in this country, many tastes, and various revivals; but through them all, the Palladian or Italian manner of Wren and Inigo Jones has held its ground, and something of a reaction towards it has lately appeared in unexpected quarters. If it be said that such architecture is unsuited to our climate, it may be pointed out that it has been generally adopted in climates not much unlike our own, and these who have lived in one of the solid houses, of simple outline, which the architects of the English Renaissance have left to us, would not care to change, to the so-called picturesque creations of Modern Gothic, with their voluntary carelessness of plan, and the maximum of surface of external walls and roofs. In modern domestic work we must often welcome novelties, which we do not desire to see in our churches. We may, in the latter case, be content to rest satisfied with piers which are obstructive, and arches of unnecessarily contracted span, while, in secular buildings, convenience must rule, and science be invoked to aid us to overcome difficulties, and economise space. It is not wise of the architect to leave such matters to the engineer. He must use his art intelli-

gently, being ever ready to adapt it to all reasonable requirements, and the Renaissance, as a modern style, will apparently have less difficulty in accepting this position than the more stern and stiffer types of Mediaeval art. For grand architectural effect, moreover, and for the convenience of a spacious interior, Classic architecture possesses the dome, if not absolutely, at least more fully, than any other style. Those accustomed to visit St. Paul's, cannot accept, unreservedly, the popular doctrine that our churches must of necessity be Gothic. A calm review of the history of the Renaissance, and of the circumstances which led to it, conducts us, said Professor Barry, to the conclusion that the movement is not yet over. The Classical tastes which gave to it the first impulse still exist among us, and are likely to continue. An architecture which can give us solidity and magnificence; which can adapt itself to purposes of utility, and assimilate progressive scientific construction; which unites elegance of proportion with refinement of detail; and which welcomes the best efforts of the painter and the sculptor in a loving combination of art, cannot be easily banished from the modern practice of the civilised world.

THE ART DECORATION OF THE STAGE.

MR. Walter J. Allen delivered a lecture on this subject before the members of the Society for the Fine Arts, at 9, Conduit-street, W., on Thursday evening. The Marquis Townshend occupied the chair.

In his opening remarks Mr. Allen said his object was to contemplate the art decoration of the stage as it now is, and in order to do that it was necessary to take a retrospect of its history. In Queen Elizabeth's time the decoration of the stage was but a poor affair; the only accessories consisted of hangings of tapestry, and the floor was strewn with rushes. The Globe Theatre itself, according to Taylor, the water-poet, had a "thatched hide." Most of the halls of the different Inns of Court have been the scenes of dramatic success. The stage merely consisted of a platform, and the entrances and exits were by steps at each end, and in sight of the audience. There is no doubt the side scenes of a modern theatre help the illusion greatly, breaking, as they do, the actor away from the spectators, and leaving the impression of his art on the minds of his audience. The art decoration of the stage must have advanced rapidly, for the Globe Theatre was destroyed in 1613, from the circumstance that Shakespeare's play of Henry VIII. was played on the boards so completely, that on the arrival of the King to visit Cardinal Wolsey at York Palace, the supernumeraries fired real cannon, and the wadding being also real, alighted on the aforesaid thatched hide and burnt down the theatre in a most realistic manner. In a letter preserved in the British Museum, the writer, a nobleman, says, that the details of the dressing of the play were so complete, that the representatives of the Knights of the Garter wore all the insignia of the order, and were quite correct as to detail. The rebuilt Globe was closed with all others in 1642, by order of Parliament. The Restoration marks a great era in the history of the stage—a change both for good and evil. The decorations must have advanced in quality and have been greatly appreciated. Pepys was told by Pettigrew that he had "greatly improved the stage from the time when there was nothing but rushes on the ground, and everything mean." The rushes were succeeded by matting; for tragedy, black cloth hangings; and then came green cloth for the floor, which, to some extent, is still used. In Queen Anne's time the decoration must have been curious, for Booth, in "Cato," was identified by the line in Pope, "with flowing wig and lacquered chair." Fancy the stern Roman in a Ramillies wig and a chair of the Rococo sort! Little need be said about the progress of decoration during the last century. We look with wonder on the portraits of the great actors of the close of the century; upon Maebeth, arrayed in scarlet coat, blue facings, powdered wig, jack boots and spurs; and Hamlet, in black dress. Canaletti supplied the scenery for His Majesty's Theatre in the Haymarket when George III. was King, as did also Paul de Letherbourg. The scenery in those days depended more on the artist than on either the property man or the carpenter; but in the pantomime most gorgeous scenery was pro-

vided, chiefly by the latter personages. Coming to more recent days, to the late Madam Vestris must be given great praise for the service rendered by her wonderful taste and judgment, though he suspected that in many of her graceful productions the veteran Planche had much to do. But the revivals of the great tragedian William Charles Maeready must be very vivid in the memories of many yet living. The arrangement of the Vineyard scene in Handel's opera of "Acis and Galatea" was perfect. The scenery was supplied by these giants in art, Stanfield and Robers, who have probably never been equalled since. Maeready brought forward both those artists, Clarkson Stanfield and David Roberts, who elevated scene-painting to an art, and who made it a splendid school for landscape painters. Among their not unworthy successors might be mentioned William Beverley, William Calcott, whose scenery at the Lyceum under the management of Madame Celeste was perfect, and Hawes Craven, who is at the Lyceum setting an example of true art. At the Strand Theatre, where the stage is very limited, the scene-painter, H. P. Hall, manages to secure an effect of space which shows a thorough knowledge of his art. To the late Samuel Phelps belongs the honour of proving that the stage can be made a great teacher. He was the favorite of William Charles Maeready, and will be remembered for having raised Sadler's Wells Theatre from a most degraded condition to a high position. Phelps thoroughly understood the principles of decoration. The scenery was always perfect; never too glaring, it was an admirable background to the wonderful acting to be seen before it. The dresses were archaeologically correct, and in perfect harmony. Reference must be made to the Chamber scene in "Hamlet" for excellence of setting up. The walls of the room appeared solid rough stone, the small windows slightly tinged with stained glass, and the decorations most appropriate. Around the room were portraits in rough tapestry of the kings of Denmark, and behind the one representing the portrait of the reigning king, Polonius hid himself. On the Queen crying for help, Hamlet drove his sword through the arras upon which was represented his father's murderer; and that ghost was caused to appear by the device of the unfolding of the tapestry portrait of Hamlet's father, and the ghostly replica of that portrait appeared moving and speaking. Equally great were the revivals of the old comedies, produced under the direction of Phelps, which were as perfect as could be done. Contemporary with Phelps was Charles Kean, who took the Princess Theatre, and there produced a series of Shakesperian revivals which for magnificence were never surpassed. The revivals were the talk of the town, but the art decoration was woefully overdone. The interminable delays between the acts, the time taken to work the different scenes, and the monotony of splendour all combined to break the interest of the play itself, and the gorgeousness of the frame entirely killed the picture. The drama, as Douglas Jerrold puts it was elevated—but on to a clothes-peg. Except this over-lavishness, Kean was in every respect a true artist, and trained a good school of actors. Fechter, the French actor, showed great taste and learning in his arrangement of the stage. At the Lyceum Theatre, when manager, he went one day into the wardrobe, and taking up a dress for a piece then being played, remarked that it was very pretty but went too far, as there was a space of about 150 years in one costume, and with a pencil and paper he drew the dress perfectly correct. He introduced great picturesqueness and novelty into the scenery, and abolished the dreadful carpenter's flats closing together with a crack. The author referred to the present revival of Shakesperian plays by Mr. Irving, and incidentally argued in favour of the abolition of the supernumerary, relating many amusing instances of his marplot abilities. In Irving's revivals, attention was called to the great knowledge of the laws of light and shade displayed by the scene-painter, and in the wonderful way in which the lighting arrangements are carried out. By the judicious lowering of lights in some parts and raising them in others, the production of accidental effect is most successfully obtained. The change in the first act of "Hamlet," from the platform of the Castle to the interior, is one of the most perfect improvements in this important act. Instead of the sudden splitting of two wings, including sometimes a great exhibition of very dirty fingers belonging to the scene-shifters, the stage is suddenly darkened, a slight noise is heard, a few flitting forms may be

observed on the stage, suddenly the lights are raised, showing a palace interior as of solid stone, the floors covered with skins of deer, and all the furnishing in perfect harmony. The dresses in "Hamlet" have never been excelled. The scenery of a play ought to be subordinate and subservient to the acting, and to help in the harmony necessary for the general effect. Theatrical managers could, it was urged, at a much less cost than is now incurred, obtain a far better result, if in every theatre could be appointed an artist who, having a keen appreciation of art in its various phases, and working cordially with the principal performers, could direct the action of the piece completely, so that the grouping be arranged that the stage picture should look unstudied, and help the action of the play. One of the best stage managers of our time was the late Augustus Harris. At dress rehearsals he would, from the centre of the pit or the dress circle, direct the grouping of the supernumeraries with great judgment. He seemed instinctively to arrange them so that the composition, the colour, and the light and shade of the living stage picture were most effective. The more careful art is the more carefully it is hidden, and it would be well if, in the future, that wonderful production, the supernumerary, could be missing. Some time since, a comedy was produced at the Haymarket Theatre which had a wonderful run. One of our most popular comedians was "made up" as a very fair man. His costume was light brown, the back scene representing a Scotch moor, was highly charged with bright yellows, rich browns, and crimsons. The result was, that from the pit the actor was completely lost. Had he worn a black hat or even a white waistcoat the fault would have been corrected to some extent. Reference was here made to the admirable setting of "Plevna" and the "Battle of Trafalgar" at the Canterbury, under the superintendence of Mr. Villiers, the energetic war correspondent of the *Graphic*. It could not be denied that in some theatres the art decorations had improved greatly during the last twenty years, but in others it has gone on striding at such a pace that the decoration is all one had to see when visiting a theatre. The realism of the furniture and decorations is so great that the only artificial thing in the entertainment is the acting. At one of the largest theatres in London a great sum of money has often been spent to make one or two particular scenes excessively gorgeous and all the rest are as mean as possible, and often the costumes are anachronisms. It will be a great thing for English art when all the professions are more homogeneous, when there is more sympathy than there is now between dramatic, musical, and pictorial art. He trusted the narrow-minded prejudice would be swept away, and that these professions would soon rank equally with those of Law, Divinity, and Physics.

Mr. CAVE THOMAS, in proposing a vote of thanks to Mr. Allen, urged the importance of subordinating all scenic decorations to the acting. If one were reading one of Shakespeare's plays he could grasp the plot and see in his mind every detail without an atom of scenery, and so if the attention were fixed on the play the stage accessories were of comparatively little moment. The human intellect could not comprehend completely more than one subject at a time. The words being spoken were the chief thing for which the audience listened, and stage managers made a mistake when they allowed music, dresses, and scenery to be other than secondary to these. The first requirement of the drama was good acting.

At the meeting of the Darlaston Local Board on Tuesday, the Public Buildings Committee recommended the erection of public offices, to include the necessary rooms for the clerk, surveyor, collector, and inspector of nuisances, and Board-room; and also a Free Library, Reference Library, Reading-room, with all the necessary rooms and offices for the conduct of the business of the library. The surveyor reported that he had prepared directions for architects, and the total cost of the erections was not to exceed £1,500, and the successful competing architect would be engaged to carry out the works at the rate of 5 per cent. on the amount of the contract.

In our description of Messrs. Lindsay Bros.' warehouse at Belfast, in our issue of the 28th ult., we omitted to mention that the premises had been fitted throughout with the Patent Balance Weight Revolving Shutters, of Messrs. Salmon, Barnes and Co., of Ulverston, Lancashire.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—At a meeting of this association, on Tuesday evening, at Queen's College, Mr. J. Roddis delivered a lecture on "Pre-Gothic Ornament in Europe, and the Treatment of Terra-Cotta." The lecture was illustrated by a large number of cartoons. Mr. Roddis also exhibited some specimens of terra-cotta made from his own models by Messrs. Doudton and Co., of Lambeth, for the new College of St. Bede, at Manchester.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The sixth meeting of the Session was held last Wednesday week, the Rev. S. M. Mayhew in the chair. The Rev. Prebendary Sir B. Baker, exhibited drawings of a singular Roman vessel of brown earthenware found by Col. Akers near Chatham. It is of unique form, having apertures at both ends designed for raising and retaining water by suction, after the manner of the later mediæval watering-pots. Mr. C. Brent, F.S.A., described a forged inscription on marble from a celebrated collection, and which was found, as believed until now, in Cannon-street. Mr. Loftus Brock, F.S.A., exhibited a beautiful specimen of Egyptian glass recently found in Cyprus. It is a small phial covered with wavy lines of black worked in the material. The Chairman exhibited a fine collection of objects of Spanish glass, others from Venice, and a beautiful specimen—a mask with a background inlaid as if with silver. These were described at length by Mr. Syer Cuning, F.S.A. (Scott.). Mr. Earle Way described a collection of articles found in excavations at Princes-street, and Mr. Compton exhibited some old family plate. The first paper was by Dr. Pléné, F.S.A., descriptive of the Cave of the Oracle of Delphi. The second paper was descriptive of the little-known monument at Gunnersfield, near Shap. These are two irregular concentric circles of small stones, of sepulchral character it is supposed, but there is no trace of the usual covering-mound.

GLASGOW ARCHITECTURAL ASSOCIATION.—The first annual meeting of this association was held on the evening of Friday last, when the secretary's report and treasurer's statement were read and adopted. The report shows that a considerable amount of good work has been gone through during the first year; the essays read were on subjects of a practical nature, which have proved highly beneficial to those who have attended and taken part in the discussions which followed them. An exhibition of drawings took place during the year, and was visited by many who take an interest in architectural drawings. The treasurer's statement shows a surplus after clearing off all debts. The latter part of the evening was occupied in the election of office-bearers and hon. president. The gentlemen elected for ensuing year are:—Honorary President—James Sellars, jun., Esq., I.A.; President—Mr. James B. Stewart; Vice-President—Mr. Ambrose J. Russell; Treasurer—Mr. James Lindsay; Secretary—Mr. Alexander Rae.

LEEDS ARCHITECTURAL ASSOCIATION.—At a meeting of this society, held on Thursday week, a paper, entitled "House Planning," was read by Mr. Henry Walker, one of the vice-presidents of the association. Mr. Walker, in his opening remarks, said that he intended confining himself to a description of the points to be attended to in the arrangement of a suburban house, to cost from £5,000 to £8,000, and that his notes would be found to apply in a modified form to town houses as well. Diagrams were exhibited to explain the suggested arrangements. Before proceeding to make sketch plans he advised all architects first to see the site and thoroughly to discuss the details of the plan with the client and his wife. Mr. Walker strongly condemned irregularity of plan for the sake of mere architectural display, and quoted from the works of Sir Gilbert Scott and Professor Kerr in support of this. He recommended simplicity and compactness of plan as far as the proper arrangement of the rooms would permit, and then proceeded to explain the qualities of a well-planned house and the best kind of site to select, pointing out the position the house, out-offices, stable buildings, kitchen garden, &c., should occupy on it, and dwelt in detail on the question of aspect, prospect, and the approaches. He then entered minutely into the arrangement of the house and kitchen offices, taking each room separately, and

giving reasons why they should come in certain positions for convenience, as well as with regard to aspect, &c.

PARLIAMENTARY NOTES.

RIVER CONSERVANCY.—In the House of Lords last Friday, the Duke of Richmond and Gordon presented a Conservancy Bill. Having stated that legislation on this subject dated as far back as the reign of Henry III., and that the Statute of Sewers, passed in the reign of Henry VIII., as amended by other Acts, was still in operation for the conservancy of rivers, his Grace referred to the report of a committee their Lordships' House appointed in 1877 to show that the existing system of conservancy was very defective. Under the Bill, the first reading of which he now proposed, any ten or more landowners or any Sanitary Authority or Conservancy Board in a district would be able to supply to the Local Government Board for the establishment of a new Conservancy Board. The Local Government Board would hold an inquiry and hear any objections that might be urged against the proposal. It might then, if it so thought fit, issue a provisional order for the establishment of the Conservancy Board; but before doing so it might require an undertaking from the promoters that they would, if necessary, appear before Parliament to sustain the provisional order. One-third of the members of a Conservancy Board under the Bill would be life members and the rest members elected by the Sanitary Authority. All of the former class of members and one-half of the latter must be landowners. The Board would have power to tax the whole district, to grant exemptions from taxation where lands were injured, and to impose an improvement rate where lands were benefited by conservancy operations. Tenants would be entitled to deduct from their rent one half of the rate paid by them to the Conservancy Board. Such were the main provisions of the Bill, and he believed they were well calculated to effect the object for which they were intended. After a few words of approval by Lord Ripon and of inquiry by the Duke of Somerset, the Bill was read a first time.

THAMES VALLEY SEWERAGE BILL.—In the House of Commons there was a long discussion on the Lower Thames Valley Main Sewerage Board Bill, the object of which is to dispose of the sewage of the district below Staines by means of a large sewage farm. Its rejection was moved by Mr. Isaac, who pointed out that it would injuriously affect the comfort and the property of inhabitants, who would have no *locus standi* before the Select Committee, and Sir W. Barttelot, Mr. Serjeant Spinks, Mr. Herschell, and Mr. Raikes also spoke against it. On the other hand, Sir A. Lusk, Mr. Shaw-Lefevre, Lord G. Hamilton, Mr. Watney, Mr. Childers, and Mr. Selater-Booth supported the Bill, on the condition that it be referred to a hybrid committee, where all persons affected could be heard. On a division, however, the House threw out the Bill by 168 to 146.

METROPOLITAN WATER SUPPLY.—Dr. Playfair gave notice that on an early day he will call attention to the increase of zymotic disease in the metropolitan district, owing to the impurity of the water supply, and will move a resolution.

THE NATIONAL GALLERY.—Mr. Ritchie asked the First Commissioner of Works on Monday whether his attention had been called to the blistering of several of the paintings in the new rooms in the National Gallery, and whether he could state the cause, and what steps were being taken to prevent further injury. Mr. G. Noel said, During the recent severe frosts considerable difficulty was experienced in maintaining an even temperature in the large rooms in the building, and perhaps on one or two occasions the heating apparatus was rather overheated, so that the hot air admitted through the gratings might have caused the blistering alluded to; but I am informed that this is a damage to which old pictures are specially liable in all galleries, owing to the material being subject to expansion and contraction. The gratings have now been removed and placed elsewhere, and I am happy to inform my hon. friend that Mr. Burton, the director of the National Gallery, considers that the damage done to the pictures is not irreparable.

Building Intelligence.

HASTINGS.—Another stage has been reached in the Town Hall controversy, the Town Council having decided at their meeting on Friday last to proceed with the structure to be called the "Municipal Buildings." The site, as finally selected, will be on the stoneyard adjoining the Central Hotel, and will be entirely covered by the new buildings, which are to be erected from the designs of the borough surveyor. The principal front will be in Queen's-road, and will be 50ft. in length, two stories in height, and of Gothic design, with bluestone walls and freestone dressings. On the ground floor are placed a jury room and town clerk's office, each 25ft. by 18ft.; a magistrate's room, 18ft. by 18ft.; and robing room, 26ft. by 15ft. In a triangular piece of ground at the rear will be a rate-collector's office, 14ft. 6in. by 8ft. 6in.; waiting-room, 28ft. by 17ft.; and constables' day-room, 18ft. by 12ft.; and there are also a series of eight cells, with entrance from Station-road. On the principal floor are a council-chamber, 46ft. by 31ft.; mayor's parlour, 18ft. by 16ft.; committee-room, 18ft. by 29ft.; and two surveyor's offices, each 17ft. by 18ft. There are also a large police-court and policemen's living-rooms. The estimate for quantities will be at once got out. The total cost is set down at £15,000, and this for building alone, as the site belongs to the Corporation.

KEPPOCH-HILL.—New Board Schools were opened at Keploch-hill, near Glasgow, on Friday. The premises consist of a central building two stories high, with wings on either side, and a tower three stories high containing teachers' rooms. On the ground floor, in the centre, is an infants' schoolroom, 40ft. by 30ft., communicating with two initiatory rooms. On the upper floor of the centre building is a senior schoolroom, also 40ft. by 30ft., and having an open timber roof. Open fireplaces are introduced into all the rooms, but will only be used occasionally, as hot-water pipes are laid throughout the buildings. The site cost £9,646, and the expense of erection was £8,100. The schools accommodate 584 children, so that the cost per head is nearly £13 18s. Messrs. D. Thomson and Turnbull are the architects.

LAMBETH.—The chapel of Lambeth Palace, having fallen into a state of dilapidation, has recently been partially repaired and decorated, under the superintendence of Mr. J. P. Seddon. Its plan is a parallelogram of four bays, with a three-light window in each bay, and a five-light one at its eastern and western ends, the latter of which is now blocked up by the Lollards' Tower of later date. All the windows have Purbeck marble shafts, and till quite recently those on the south side were filled with masonry to about half their proper height. Most of these now, however, have been restored to their right proportions, and filled with stained glass. The windows were originally filled with stained glass by Archbishop Morton, and at Land's trial it was alleged that "he did repair the story of those windows by their like in the Mass-book." The subjects illustrated on the glass are now, as then, the types and antitypes of our Lord, showing forth, by such, the history of the world from the Creation to the Judgment. The sacra-rium has been enriched by a pavement of encaustic tiles inclosed within marble steps, with foot-pace and oak altar-table, the whole being from special designs of the architect. It is contemplated to add shortly an organ, to be placed in a chamber of the Palace abutting upon the north side of the easternmost bay of the chapel.

LISKEARD.—After having been closed for about nine months, during which the work of restoring it has been carried on, the ancient parish church of Liskeard was opened on Wednesday. With the exception of that at Bodmin, Liskeard Church is the largest in the county of Cornwall. The style is "Debased Perpendicular." The church, which is dedicated to St. Martin, Bishop of Tours, consists of a chancel, nave, north aisle, built in 1477, south aisle, erected in 1428, extreme south aisle or lady chapel, and vestry. In the course of restoration, the old organ-loft, at the west end of the nave, has been removed, and an organ chamber has been constructed near the eastern end of the north aisle. In the north porch there is a stoup, and the remains of another exist in the south porch. At the west end of the north aisle, near the tower, there is a Lychnoscope. A small

window has been inserted in the south porch, between the two lower niches for the purpose of lighting the gallery stairs. The pulpit which bears the date 1636, is tastefully ornamented with Arabesque carving, and is said to have been the handiwork of one Peter Short, once a native of Liskeard. The tower is much older than the other portions of the church. The tower stages and the arch leading into the nave are Norman. Most of the original style is preserved in the north side of the tower, but the west and south sides are patched up with a veneering of granite and plaster. A new waggon-headed roof has been put over the entire building. The roof is in pitch pine with carved bosses. There are seventeen windows in the church, of which fifteen are new ones. The whole work has been carried out by Mr. Thomas Lang, contractor and builder, of Liskeard. The contract price was £2,350, but there have been some additions, which it is expected will make the amount up to £3,000. Mr. R. Coad, of the Adelphi, London, W.C., was the architect.

METROPOLITAN BOARD OF WORKS.—At this board on Friday, a deputation from Bermondsey Vestry attended to support a memorial from that body, praying the board to reverse the decision arrived at last week, and to give their consent to the lines of tramway proposed by the South-west and Deptford Tramways Bill. It was pointed out that the action of the board, if carried out, would leave a population of 100,000 at the mercy of a railway company, and give a monopoly of the tramways in the south-eastern district of the metropolis into the hands of one company. The memorial was referred to the works committee for consideration and report. In the engineer's department, Mr. Charles Elwin was appointed in the first class of officers at a commencing salary of £240 per annum in place of Mr. R. A. Rumble, constructive draughtsman, retired. The Building Act committee reported with reference to the letter from Mr. E. L. Paraire, relative to an alleged overcharge by Mr. Kerr, district surveyor of Saint James, Westminster, in respect of certain alterations at the London Pavilion, Tichborne-street, that, in their opinion, considering the large amount and the important character of the work done to a public building, the fee charged is not an unreasonable one. With reference to the letter from Mr. E. D. Drury, district surveyor of part of Westminster, requesting opinion as to the exemption of the buildings within the Close of the Collegiate Church of St. Peter, the solicitor was authorised to express to the district surveyor the opinion that by the Amendment Act of 1878, Westminster Abbey is not exempted from the provisions of the Metropolitan Building Act of 1855, and to support any action taken by the district surveyor to enforce the law. It was referred to the works committee to consider and report on the advisability of proceeding with the Bill for the erection of the Tower Bridge.

SHEFFIELD.—The foundation stone of the new church at Sheffield, Hants, was laid May 24th, 1875, and it is hoped that in the course of the present summer it will be opened. The church was designed by Messrs. John Colson and Son, of Winchester. The general contract was taken by Messrs. Knight and Son, builders, of High-street, Wickham, and the work is now complete save the erection of the tower and spire, and some of the internal fittings. The building is in the Decorated style, and consists of a nave, south aisle, chancel, and south transept, having an entrance in the form of a priest's door out of the latter, and a fine porch at the south-west angle. Provision is made for readily adding a north aisle. In the building, local stone is used for the walling, whilst the dressings are of Bath stone. Within, coloured bricks are used considerably, with good effect. The carved work has been carried out by Mr. Harry Hems, of Exeter. The clerk of works, during the main portion of the work, was Mr. H. A. Amey.

The Commissioners of Sewers for the City of London decided last week to discontinue the electric lighting experiment on Holborn-viaduct, at the termination of the three months contract with the Société Générale, on account of the great cost. The company offered to reduce the price to 5d. per hour per lamp, but the Commissioners' declined the offer, as it would have been three and three-quarters the outlay upon gas, and the electric light was accordingly displayed for the last time on the Viaduct on Saturday night.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—H. and G.—R. J. C.—E. S. and Co.—J. R. W.

VER DOYANT. (To Students only. The Secretaries of the R. I. B. A., and the A. A. will give all information respecting these Societies if written to at 9, Conduit-street, W.)—G. H. R. (The Silicate Solution, see advt. pages.)

MEMO. (Baldwin Latham's work on Sewerage, published by Messrs. Spon, is the most complete work we know of. There is also a small treatise on drainage, in Lockwood's series. The "Suggestions" published by the Local Government Board lately may be of help.)—C. F. W. (Numerous figures of the kind you send us occur in medieval masonry, but opinions differ as to their intention. Most probably it is a mason's mark.)

"BUILDING NEWS" DESIGNING CLUB.

LIST OF SUBJECTS.—1. A row of three shops for a village street, one being at the corner, suitable for the trades of a butcher, draper, and grocer. The houses to be three stories high, including the shop. A private entrance required to each. Frontage to corner shop, 20ft., others 18ft. each. Materials, brick and timber, and files for roof. Plans, elevation, and perspective sketch. Scale, 8ft. to the inch. 2. A pair of wrought-iron gates for a suburban villa, 8ft. wide, with stone piers. Scale 1in.

ELEVE. (We cannot entertain your suggestion of considering the ages of competitors. Such a task would be profitless.)—Y. Z. (The conditions of the Designing Club were published Sept. 29, 1878, in the BUILDING NEWS, a few copies of which are in print.)

DRAWINGS RECEIVED.—Maltese Cross, Con Amore, Memor Estor, T. G. Good, Essayez, Elève, East Anglian, Dunwich, Rusticus, J. C. in circle, T. W. P., Belteshazzar, James, Dagger and Triangle, Try, "Be to its Merits, &c." Pat, Ogmores, First Attempt, Signum, Burswell, Ubique, Norwich, Cymraeg, M. with leaves in circle, Omnia Vincit Labor, Melina, Pecksniff, J. G. in square and circle.

Correspondence.

A MEMBER OF A BUILDING COMMITTEE ACTING AS SURVEYOR AND CLERK OF WORKS.

SIR,—Not a few gentlemen would be glad to know your opinion, and a few other professional gentlemen's, how far a Building Committee has acted wisely and in the interest of the building and the subscribers, under the following circumstances. A public hall is being built by public subscription, from plans, &c., of a London architect of high standing, one of the oldest members of the R.I.B.A. The old public hall having been built about a dozen years ago proved defective and unsuitable, the builder of the same being a member of the present Committee, acting on their behalf during the competition of the contractors for the work, at the same time performing the duties of Surveyor, taking out the quantities for one of the competitors. The tenders were sent in and a few days after opened. The lowest estimate being from the oldest builder in the town, who has built a very nice church here to his credit under

Mr. Street, R.A., but he declined to do the work, the Committee having demanded of him stipulations beyond those in the specification; the next lowest being the builder for whom the Committee-gentleman has taken out the quantities, a man who has only lately taken to the building trade, his estimate being only £6 below the next, a thorough practical builder of many years' London experience. Since the commencement of the work, the said Committee-gentleman has been appointed to act as Clerk of the Works. The quantities have been proved not quite correct, and since the digging has been commenced other difficulties have crept up, which will have to be met by the usual bill of extras, &c., of course most of the subscribers thinking everything is being done with the knowledge and consent of their architect. I presume I am correct in thinking that a member of a public body acting in a similar way, would be acting illegally and rendering himself liable to a fine?—I am, &c.,
AN OLD READER.
10th March, 1879.

DISTRICT SURVEYOR'S FEES.

SIR,—Mr. Hugh Rounmieu Gough writes you respecting a Building Act case, decided lately by the magistrate, in which I claimed notice for works done by Messrs. Adams. You must permit me to say that I cannot accept Mr. Gough's account of the facts. The law is that Messrs. Adams shall give the District Surveyor notice of their work with "particulars." How is that officer to know otherwise what is being done, so as to be able to perform his duty? Mr. Gough knows very well that Messrs. Wontner Smith's notice was for nothing more than this (I give the exact words and the whole of them):—"Putting in new window and building for lift, &c." How can he pretend to tell your readers that this ought to afford to the District Surveyor the information, with "particulars," that Messrs. Adams were, not only *separately*, but *subsequently*, to take a contract for steam-piping and cooking apparatus? I may say that it was with considerable difficulty I discovered what Messrs. Adams were doing; and their work was very wrong indeed. Suppose the club-house had been burnt down through those steam-pipes; would the District Surveyor have been responsible for negligence under Messrs. Wontner Smith's notice for "a new window and a lift," because they put an "and" at the end of it?

As regards the fees, the case is plain enough. Each builder becomes liable for his own fee—generally a very trifling sum; and if there should be several thus incurred, the District Surveyor will, I believe, be always found ready to abate part. My own abatements are very substantial in such cases.

By the way, Mr. Gough forgets to tell you that I begged off "the penalty in each case of £20," wishing only to have the law settled—as it had frequently been before. Messrs. Adams were fined one shilling for not having given notice. As regards the penalty of £20 for having fixed the steam-pipes (systematically as a whole, and not "a steam-pipe" by accident) in dangerous proximity to the wood-work, it obviously ought to fall upon the architect under whose directions such a thing has been done, and unfortunately the Building Act cannot reach him. But if the fire insurance of the Army and Navy Club-house were pronounced invalid, on account of the cause of fire having been steam-pipes fixed contrary to law without the public surveyor's knowledge, how would Mr. Gough stand, and what would the lawyers' say to his shabby quibbles about the necessity for economising the little fees by which the District Surveyors are paid for their trouble and often serious responsibility. I hope Mr. Gough may one day be a District Surveyor himself, and then he will vote the other way to a certainty. If he should say that he has no ambition to hold such an office, my case is all the stronger.—I am, &c.,
ROBERT KEER.

A NATIONAL STYLE OF ARCHITECTURE.

SIR,—I was much struck with two letters in the Correspondence column of your issue of 28th February. They are in opposition, and show forcibly the dilemma in which architects are placed regarding the development of a new and suitable style of art.

In the one letter the writer bemoans the fact that we do not seem in an "honest state of transition or development." We copied Greek art, then Roman, till someone cried, "We ought to

throw aside pagan art and develop Christian art," i.e., Gothic. Then such men as the late Sir G. Scott came to the front, and we pass through an epoch of careful restoration of Mediaeval work. All praise to such careful restoration; but applied to modern requirements we pass through a fever of Gothic contortions—from Early Pointed to Late Depressed, with a jumble of everything from anywhere thrown in as a spice; till architecture becomes without a principle, degraded to a fashion, and we are told in a mincing manner that the latest fashion is the "Queen Anne."

The natural outcome of all this is illustrated in the other letter, where we are told that a fireplace being designed in the strictest "truth and consistency," i.e., large, square open jambs, with a dog-grate for wood fuel, puffs out black smoke most provokingly in the designer's face when he attempts to burn coals (probably) therein; but, miraculous to tell, it ceases when a glass smoke-board is put on.

When will it be known that architecture (or art) does not consist in copying ancient forms or ornament, nor in being Pagan or Christian; but in constructively meeting the requirements of the case, and in a tasteful manner.

Architects must copy, not *what* the ancients did, but *how* and *why* they did it. The mere copying what the ancients did and of conglomerating different parts, results only in the *want* of style.

Who is the successful designer of the present day? Not the architect, but the engineer. The one is a copying clerk to old forms, the other is a thinker, a designer, an applier of mechanical contrivances to meet present requirements, and, consequently, whatever he makes possesses style as distinctive of the 19th century as the Parthenon or the Baths of Caracalla are of the Athenian and Roman period. We have only to point to the beautiful arched roof of glass and iron of the railway station, the catenary curve of the suspension bridge, the lattice work of the girder-bridge, &c. Each possesses a new style intrinsically their own; and when touched by the wand of taste, after meeting constructive requirements, seem to me almost perfect and beautiful.—I am, &c.,
"19TH CENTURY."

FIREPLACES AND THEIR CONSTRUCTION.

SIR,—It may seem out of place to write about alterations in the form of fireplaces at this time of day, but I think that some little improvement may still be made on their construction. As the object of a fire is to heat the whole apartment, and not the wall against which it is placed, I think the chimney-piece might with advantage be made to project further into the room than is generally the case at present (something in the style of the fireplaces in old castles), so that the grate might be brought well forward into the apartment. There would then be an open space or chamber left behind the grate, into which the soot might drop. It seems to be an evident mistake that the part of the wall behind the fireplace should be made so much *thinner* than the other parts of the wall, as it usually is. This is especially the case in outside walls, where this part, instead of being thinner than the rest of the wall, should be made thicker to *retain* the heat from the fire, and not let it be spent on the outside of the wall altogether, and lost in warming the open air. Keeping the chimney-piece and grate well forward would to a considerable extent remedy this common defect, and it would at the same time enable designs for the prevention of the smoke nuisance being put into execution. For the furtherance of this other important object, I beg leave to submit a plan for consideration.

My proposal is, that in the top of the back of the grate—or, if that would not suit, in the top of a thin partition immediately behind the grate—there be made a round hole, from six to nine inches in diameter, and that into this opening there should be inserted a perforated iron cylinder, closed at one end (made either of light bar or perforated sheet iron), with the open end resting on the grate or partition, and the close end on an axle working in an eye attached to the back of the wall. The axis of the cylinder would be horizontal, and at right angles to the grate; and in the mouth of the chimney the smoke would pass through the cylinder, and a great part be retained in it in the shape of soot, so that part of the smoke would not go up the chimney at all. As the cylinder would soon get clogged,

I propose, for cleaning it, that two brushes of the same length as the cylinder be placed close to it, parallel to, and at the same distance from, the floor as the axis; and that there be a crank, with a handle, attached to the cylinder, to turn it round and bring it in contact with the brushes. The cylinder could be swept by turning the handle when the fire was cooled, or when necessary. Of course, the brushes would have to be cleaned (or even changed), and the chamber cleaned out occasionally. I think some method of this kind might be adopted to assist in mitigating the smoke nuisance in cities.—I am, &c.,
W. YOUNG BLACK.

COLOUR IN ARCHITECTURE.

SIR,—With reference to the paper on the above subject, read by Mr. J. W. Tonks, before the Birmingham Architectural Association, I think that in justice to the author it should be known that he is not in any way directly connected with the architectural profession, and further that Mr. Tonks does not profess to be an authority upon the subject which he treated.

Mr. Tonks is a "Designer," and as such is well-known in this town. Before commencing to read his paper, he told us that his opinions were simply those of an outsider, and that his only object was to give a few hints as to what, from an outsider's point of view, might be done to improve the appearance of our buildings, and that if we, as professionals, deemed them worthy of our consideration, our technical knowledge would suggest the proper means of carrying his ideas into practice.

With reference to what your correspondent says about the "Grand Hotel" and "School Board Offices," which by the way is altogether wide of the subject, permit me to quote the exact words used by Mr. Tonks. He said, "The use of terra-cotta of different colours is common among the modern buildings on the Continent, although but little adopted here. A mixture of it is seen in the new range of buildings in Colmore row, part of which is known as the 'Grand Hotel,' and another part as the 'School Board Offices.' The effect of a band of colour, though so moderately given, is good, and should encourage architects to seek by colour contrasts to balance, as far as may be, the neutralising effects of our climate, air, and smoke."

You will see, sir, that Mr. Tonks does not describe any building as the "School Board Offices," although I must confess that your abstract of his paper made it appear that he did so; but "A Birmingham Reader" ought to know that in brief abstracts such "slips of the pen" are almost unavoidable.

As to the introduction of terra-cotta in the Grand Hotel, Mr. Tonks was certainly at fault. The bands which he mistook for terra-cotta are in reality red stone; but the mistake was really not worth notice, as it did not affect his meaning in any way. It must be obvious to everyone, except "A Birmingham Reader," that what Mr. Tonks wished to point out was, not the use of any particular material, but the introduction of colour.—I am, &c.,
FRED. G. HUGHES.

Hon. Secretary of the Birmingham Architectural Association.

Queen's College, Birmingham,
March 11, 1879.

EXTORTIONATE CHARGES.

SIR,—There is not that difference in the scales of charges of the two journals referred to by "M." on p. 264, which would appear at first; but the extortion is none the less apparent. It is managed by what printers call "making lines." Let "M." pick out a longish "contract" advertisement appearing in the current issues of both journals and *count the lines*. He will find that the same advertisement is bumped out to make three or four more lines in one paper than the other, and charged accordingly. I invariably found this the case with advertisements sent on behalf of my Authority, and I pointed it out some time since to the Clerk; since then our advertisements have appeared only in your columns, and we always get as many replies as before.—I am, &c.,
A SURVEYOR.
March 8, 1879.

It is proposed to erect a stained window in the Lady chapel of the collegiate church of Crediton, Devon, as a memorial of the late Mr. Richard J. King, the well-known archaeological writer and the author of Murray's "English Cathedrals." Mr. King, who was formerly a magistrate for Devonshire, resided of late years in a cottage at Crediton.

Intercommunication.

QUESTIONS.

[5701].—**Sewerage.**—Would some of your readers kindly inform me at what inclination in a line of drainage it becomes necessary to have a tumbling bay, and, supposing a considerable length of sewer, would it be advisable to have flaps at each manhole to prevent the sewer gases rising to the highest point, and would this apply to a continuous sewer, as well as one that was stopped?—J. S.

[5702].—**Sanitary Examination.**—I believe that there exists some society holding examinations into the qualifications of sanitary engineers and inspectors, who award certificates of competency to the successful candidate. I should be much obliged to any correspondent who would give me the necessary particulars as to the mode, time, and location, fees, &c., or information as to where I could obtain it for myself. A list also of the books that had best be read on the subjects of the examination would also be thankfully received by—GOLUMPTIONS.

[5703].—**Stone Floors.**—I would like to know the cost of executing a stone floor of 22ft. bearings, supported by rolled iron girders, compared with a similar floor, carried out entirely with wood? I shall be obliged by your reader kindly informing me of the way to calculate the weight stone floors, composed of iron girders and 2-inch planks doubled (Lancashire system) will carry. Also, the best kinds of floors for stores and warehouses.—PECK-SNIFF.

[5704].—**Excursion.**—Will some reader give a list of any objects of architectural and archaeological interest between Rugby and Bedford, via Northampton, which would repay a visit by—BICYCLIST.

[5705].—**Chequered Plates.**—I should be obliged to any reader who would give me a description of chequered plates.—A YOUNG FETTER.

[5706].—**Labourers' Cottage Fittings.**—Would some of your readers give experiences connected with following items in labourers' cottages? 1st. In the kitchen or living room, is a range preferable to a good barred grate for a class that cannot afford meat to roast often in the twelve months, and that probably understands baking their cake on a flat griddle better than in a close oven? What small ranges, of value not exceeding £3, and of strong castings, have proved themselves good by some years' trial?—AGRICOLA, Cork.

[5707].—**Haslingden Flags.**—In looking over a specification of some property in the neighbourhood of Manchester, I find the following:—"Scullery, kitchen, and pantry to be flagged with 3-inch best Haslingden flags, and the stables and yards paved with 6-inch stackstead setts." Can any correspondent say where to get, and what is the quality of, the stone quoted? Is it as good as York stone?—M. WATSON.

[5708].—**Hospital Planning.**—I shall be obliged if some correspondent will inform me what is meant by the blocks of Hospital wards being arranged "en echelon."—S. P. G. T.

REPLIES.

[5692].—**Cast of Carving.**—Looking back at my original reply, under the above heading, Jan. 31st, I said, speaking passingly of modelling clay, that it was "procured in large quantities in Devon, principally in the neighbourhood of Chudleigh." "J. B." takes exception to this, saying the "statement is calculated to mislead." Is it so? A glance at the map of Devon will show the county to be some seventy odd miles across from east to west; and about the same in measurement from north to south. Now, if the compass be put on to the paper at Chudleigh-road station, and a circle struck at a radius of four miles, it will be found the line will embrace every one of the six parishes that "J. B." in particularising mentions as those the clay is dug from. Thus, it will be seen, I not only gave the county, but the locality where clay is procured, and, "J. B." instead of correcting, as he calls it, any error of mine, has merely added, as a matter of detail, the names of some half-dozen little parishes, all clustered together, wherein the clay is dug. I have been accustomed to use modelling clay almost daily for the last 20 or 30 years, and the result of my experience is given when I say that I have found the clay from the pits of Messrs. Watts, Blake, Bearn and Co., and of Messrs. Whiteway and Co., to be the best I ever used. "J. B.'s" knowledge of the yearly expenses of various clay merchants who ship, a knowledge so intimate that he is able to render an account of their annual disbursements to the penny, suggests that he is not altogether a disinterested person in the fluctuations of the clay market. Hence, what he says thereon necessarily bears less weight than it would do otherwise. But, it would be instructive if, instead of restricting his remarks to quibbles upon pipeclay, "J. B." would, taking a model from the excellent example of my old friend, Mr. H. Terry (Feb. 7th, '79), give further advice upon what he entirely ignores, the primary question asked, i.e., "Which is the best way to take casts of carvings?"—HARRY JIKES.

[5692].—**Caats of Carvings.**—"J. B." writes so furiously respecting Mr. Harry Jikes' useful information that one is almost inclined to think "Brown" himself, first member of the firm "J. B." says Mr. Jikes entirely ignores, could not have more indignantly corrected the oversight. But, with a vivid recollection before me of a pleasant trip, not a very long time ago, into Devonshire, I can fully substantiate what Mr. Jikes has told us. Newton Abbott, Chudleigh, Henneock, and, indeed, all the other little places "J. B." refers to, lay within a radius of three or four miles of one another, and it is quite sufficient to know that pipeclay is obtained in South Devon, without defining any particular set of little towns and villages such as "J. B." appears to deem necessary. It would be much more interesting if "J. B." who appears to know all about it, instead of repeating what Mr. Jikes has already told us as to pipeclay being decomposed granite, would explain by what curious transformation granite becomes clay. This will be useful and instructive, and, by so-doing, "J. B." will render infinitely more public

service than by making petty corrections and giving particularly dry quotations as to what the shipping dues may be of "Brown," Jones or Robinson.—YORKSHIRE.

[5697].—**Weight of Wrought Iron Girder.**—In my anxiety to give every information I possibly can, I have hurriedly worked out the calculation, as desired by "Learner," having just had my attention called to his question:—

20	0	= 30	0	in. web	=	7	ft. 6	in. one inch thick.
20	0	= 15	0	in. flange	=	7	6	" "
20	0	= 15	0	in. flange	=	11	3	" "
4	20	0	= 53	4	in. angle iron	=	20	0
							46	3
6	100	= 360	in. rivets 2	in.				
				long = 75	ft. of			
				round bar			3	26
							17	2
								0

If he refers to the second edition of my work "Quantities" he will find the amount so stated. The item for rivets is three to a foot, 20ft. long = 60, and six times 60 for the 6 rows.—BANISTER FLETCHER.

[5697].—**Weight of Wrought Iron Girder.**—Many thanks for "R. J.'s" explanation of the item for rivets. I note a misprint in my reply 500; 6 egg and tongue carving should be 5'0"; 6' egg, &c.—BROTHER LEARNER.

LEGAL INTELLIGENCE.

A HEAVY FINE FOR BREACH OF BUILDING REGULATIONS.—District Surveyor for East Hackney (North) v. Henry Shipp, heard at Worship-street Police-court, on the 6th of March, 1879, before Mr. Bushby.—On the 9th March, 1878, an order had been made for the defendant, within one month, to amend certain irregularities to four dwellings, Lockhurst-street, Clapton Park, but on the 19th February, 1879, the order had not been complied with. This was proved by the District Surveyor, and the defendant was fined £100, having been previously fined £56 6s. in respect of the same matter.

NEGLECTING TO GIVE BUILDING NOTICES.—At Lambeth Police-court on Thursday, the 6th inst., Frederick Vyner, of Tintern-street, Brixton, was summoned by Mr. Parsons, district manager, for neglecting to give him proper notice, under the Metropolitan Building Act, in respect of certain houses in Tintern-street. The district surveyor explained that it was the practice with a certain class of builders to commence the erection of buildings and carry them up to a certain stage, and then suspend operations for some length of time, after which work was resumed, ostensibly by the original builder, but really by mortgages or other persons who were unknown to the district surveyor, and who in consequence found himself greatly impeded in enforcing the provisions of the Act. These arrangements were carried out by the agency and assistance of working men like the defendant, who thought it very great fun to plead entire ignorance of everything when questioned by the district surveyor or his assistants. They, on being questioned, never knew who they were working for, nor where their employer lived. He called Mr. W. H. Rawlings, his assistant, who fully proved the case, showing that defendant stated he was working for a Mr. Iles, but that he did not know his employer's address. The work was commenced a year since, suspended for some months, and then resumed. Afterwards, when a bench summons was about to be served on him, he said he was working for the mortgagee, a Mr. Bartlett, but no notices were sent the surveyor as to a change of builders. The magistrate (Mr. Ellison) said the Act provided that notice should be given to the surveyor after work had been suspended, or if the builder was changed, and the Act defined the "builder" as not only the master builder, but any person engaged in doing any work on the building. Defendant would be fined £3, and 12s. 6d. costs, and he might apply to the mortgagee to repay it.

REFUSAL OF CERTIFICATE.—STEVENSON v. WATSON.—This was a case which came before the Common Pleas Division last week upon demurrer to a statement of claim, and it raised a question of considerable importance as to the liability of architects in relation to their duties under building contracts between master and servant. The plaintiff was a builder employed under a contract to erect a large building as a temperance hall near Nottingham, and the defendant was an architect employed by the building owners to superintend the execution of the works. The defendant had previously prepared plans and bills of quantities of artificers' work, and these plans and bills formed the basis of the contract which was executed between the plaintiff and the building owners. The bill of quantities contained also two further stipulations—first, that should there be more or less measure than was there given, there would respectively be an addition to or deduction from the contract; and, secondly, all measurements were to be made in the same manner as the quantities had been taken, and all additions or deductions

were to be priced at the same rate by the architect. The contract then set out the following conditions, which appeared in the statement of claim:—"The architect might order any additions to or deductions from the contract without in any way vitiating the contract, and the amount of such additions or deductions was to be ascertained by him in the same manner as the quantities had been measured, and at the same rate as they had been priced at. Another clause provided that all disputes between the plaintiff as contractor and the building owners, which might arise during the progress of the works, were to be settled by the defendant, whose decision was to be final and binding on all parties; and lastly, it was provided that the plaintiff was to be paid on certificates, signed by the architect, of the work done and money which was due. The claim then stated that from time to time the architect did certify accordingly until the works were completed. A final statement of accounts was then sent in by the plaintiff to the defendant, showing that, after adding to the contract the amount of the additions ordered by the defendant and deducting the amount of the deductions ordered by the defendant, and making all necessary corrections to errors discovered in the bill of quantities, a net balance was owing to the plaintiff of £1,616 6s. 7d.; but the defendant, without calling upon the plaintiff for an explanation, certified only for an excess over the estimate of £251, and thus did not use that due care and skill in ascertaining what was really due to the plaintiff, on the faith and expectation of which he had been induced to sign the contract, but knowingly and negligently certified for an inferior sum. The claim concluded that upon complaint made by the plaintiff the defendant refused to give any reasons or to reconsider the matter. To this statement of claim the defendant demurred, on the ground that the statement showed the defendant to be in the position of an arbitrator who had acted and declared his decision, and that, as no fraud or mala fides was suggested, no action against him was maintainable. Lord Coleridge described the action as one of a kind which had been vainly brought over and over again—viz., for the negligent performance of a duty in the execution of which the exercise of judgment and opinion was necessary. The contract only required that disputes between the contracting parties should be settled by the defendant, and he was in no way bound to enter into any reasons for any decision he arrived at, having regard to the relations that existed between him and the plaintiff. Mr. Justice Denman concurred. The duty of the defendant, in his judgment, was to perform what he had to do honestly, and there was no suggestion in the statement of claim of any mala fides or dishonesty. The nature of his duties was strictly analogous to those of an arbitrator, and not, as had been suggested, to those of a mere appraiser. Ordinary acquaintance with building contracts showed that an architect could not be regarded as a mere ester-up of figures, and ought not, therefore, to be held liable for negligence when a mistake in figures or measurements occurred. The demurrer was therefore allowed, but it is understood that the question will yet be carried to the Court of Appeal.

WATER SUPPLY AND SANITARY MATTERS.

LEAMINGTON.—The new waterworks at Leamington were opened on Tuesday. Hitherto Leamington has derived its supply from the river Leam; but the water of that stream becoming unfit for use, works have been constructed, at a cost of upwards of £25,000, for obtaining water from a deep boring in the red sandstone. The water is lifted by two engines, of 65 horse-power each, into the reservoirs on the Newbold Hills, from whence it gravitates over the town.

WEYMOUTH.—At a meeting of the Corporation of Weymouth last week, the Mayor presiding, a report on the sanitary condition of the borough, from Professor W. H. Corfield, M.A., was read and considered. Professor Corfield had been appointed to make an investigation of the harbour, backwater, and surroundings, with a view of giving his opinion as to any alleged cause of nuisance. It was a very exhaustive report. Professor Corfield is strongly of opinion the sewage of the town should be taken entirely out of the backwater and harbour into the sea. A joint report from Dr. Tizard, the medical officer of health, and several other medical men was read, endorsing Professor Corfield's opinion, whilst letters were received from Dr. Lush and Dr. Wood also approving his suggestions, and urging that the sewage should be carried out to sea. The following resolution was agreed to, on the proposal of Mr. Councillor Nangle, seconded by Mr. Councillor Howard:—"Resolved, that Dr. Corfield, having amongst other things been asked, by order of this Authority, 'What suggestions can be made by way of remedying the offensive smells complained of?' this Authority do adopt the words of the reply thereto, viz., to 'Divert the sewage entirely from the backwater and harbour; and that this

Authority do instruct the town clerk to call a committee meeting of the whole Urban Sanitary Authority of this borough, on one day of the ensuing week, and from week to week if necessary, to consider and settle means for arriving at a scheme to carry the same reply or suggestion into effect."

Our Office Table.

At the annual meeting of the Royal Birmingham Society of Artists, on Saturday last, Sir F. Leighton, the President of the Royal Academy, was elected President of the Birmingham Society in the room of the late Sir Francis Grant. Owing to his advanced age and inability to attend the meetings, Mr. Peter Hollins (much to the regret of his colleagues) some time ago intimated his desire to resign the vice-presidency, and Mr. J. H. Chamberlain was on Saturday elected to that office. Mr. E. R. Taylor, head master of the Birmingham School of Art, was elected a member of the society; and Mrs. G. J. Whitfield (formerly Miss Florence Westwood) was elected an honorary member—the first election of a lady in the history of the society.

A PARLIAMENTARY paper has been issued containing the annual report of the Director of the National Gallery to the Lords Commissioners of the Treasury for the year 1878. During that period the following pictures were purchased out of Government funds:—"Mary Magdalene approaching the Sepulchre," by Giovanni Girolamo Savoldo; "St. Helena—Vision of the Invention of the Cross," by Paul Veronese; "The Agony in the Garden," by a painter of the Umbrian School; "The Adoration of the Magi," attributed to Filippino Lippi (or Botticelli?); "The Nativity," by Sandro Botticelli; "Portrait of a Gentleman," by Francia Bigio; "A Landscape" (snow scene), by Mulready; and "A Landscape" (Gordale Scar, Yorkshire), by James Ward, R.A. The following were purchased out of the "Lewis" Fund:—"Portrait of a Gentleman," by a Flemish painter of the 16th century; landscape (river and rocks), by W. J. Muller; "Portrait of a Gentleman" (three-quarter length), by Catharina van Hemessen; and a fragment of a composition in fresco, by Ambrogio Lorenzetti. Among the additions to the Gallery may be noted "A Canon and his Patron Saints," by Gheeraert David, bequeathed by Mr. William Benoni White, and "A Portrait of the Rev. Sir Henry Bate Dudley, Bart.," and seven studies of landscape in crayon, all by Gainsborough, presented by Mr. Thomas Birch Wolfe. The total number of pictures now contained in the public rooms of the gallery is 1,008, 607 of which are covered with glass.

READERS desirous of comparing at a glance the respective prices of roofing slates of all sizes per 1,200, per 1,000, and per square, will find themselves very materially assisted by a handy little "Roofing Slate Ready Reckoner," published by Mr. Alfred Baker, of 51, North-road, Brighton. The cost is only sixpence, and the amount will soon be saved sixtyfold in time by the use of the table, which is printed on card for office use, or on paper for the pocket.

From the report of Mr. Haywood, engineer and surveyor to the Commissioners of Sewers for the City of London, of works executed during 1878, we learn that a large number of street improvements were executed, including the completion of the Cheapside and Poultry improvement by the setting back of the block of houses between Old Jewry and Ironmonger-lane. Specimens of Poletti and Dimf's patent pavement, and of Dennison's wood and iron pavement, both laid in Beech-street, were taken up and replaced by wood paving; the former had been worn into holes and the blocks had broken, while the latter appeared slippery and dangerous. Dennison's leaden disc pavement in Cornhill was taken up two months after being laid down, and replaced by Limmer's asphalt, the leaden discs having become worn through or pressed out from the asphalt by the traffic, and the specimens of Stone's patent footway pavement in King William-street were taken up after six years' use, having become worn hollow and very inconvenient. There have recently been laid down in Shoe-lane, near Farringdon Market, specimens of Davison's patent iron and asphalt pavement and Dennison's noiseless granite pavement, which are at present under trial. Reference is made to the great changes which have been made in the carriage-way pavements of the City during the past ten years by the substitution of various forms of asphalt and wood paving for granite, and Mr. Haywood states that at the end of 1878 there were laid down in the City, 9,688 yards of compressed asphalt, 1,611 yards of mastie ditto, and 11,164 yards of wood paving, making a total of about 12½ miles of these classes of street-paving now in use.

A CORRESPONDENT of the *Northampton Mercury* tells a good story of the building speculations of the unreformed corporation of Higham Ferrers. He says: "Our venerable corporation launched into the building trade, and placed themselves in the hands of builders with a really charming amount of trustfulness. Advertisements were issued inviting plans for a number of cottages to fill a certain piece of ground. Plans and estimates were sent in and one was accepted. The builder, however, refused to sign the contract. The corporation then made a fresh start, and employed a person to draw up plans and specifications. They then again invited tenders for the buildings, either in one or more blocks (the plan was to build in five blocks). One of the tenders received for a certain number of houses was £95 per house, while another tender for the whole lot was £120 per house. The corporation preferred the tender at £120. According to the plans, the houses were to be spouted, and the front spouts were to have a pipe to bring down the water between every two cottages. This has been done, but as there is no drain to take off the water it has for the past twelve months been running into the foundations of the houses. It has now, however, been resolved that the front spouts shall be discontinued, and the whole of the spouting altered so that the water may be taken round to the back of the houses and discharged into the sewer. What the cost of this will be of course we do not yet know. But the

coup de grâce has just been performed. The plans show a road on the south side of the houses about six feet wide. This has been twice approved of by the corporation, and the road, which has been partly made, will cost about £20. There is no outlet, and before the road was finished the corporation built up the entrance, so that here is a good road blocked at both ends!"

CHUBB'S

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And Honourable Mention at PARIS EXHIBITION, 1878. Illustrated Price Lists post-free.

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Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, RHEUMATISM, SMALL-POX, SCARF, DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. Use no substitute.—(Advrt.)

ROOFING SLATES.

Reduction in Prices.

Send for price list to THOMAS R. ROBERTS, Slate Merchant, Conway, before ordering elsewhere. Slate slabs, gills, hearthstones, ridges, cisterns, and all other kind of slate work very cheap.—(Advrt.)

CHIPS.

Negotiations have been opened between the Corporation and the Waterworks Company at Colchester for the purchase of the works by the Council, as the urban authority of the borough, at from 23 to 28 years' purchase on the net profits of the company.

New Board Schools at Longton were opened on Monday week. The building is in the domestic Gothic style. The architect was Mr. T. P. Hulse, and the contractor, Mr. W. Collis, both of Longton.

At a vestry meeting recently held at Gamlingay, Cambridgeshire, it was decided to restore the parish church, which is in a greatly dilapidated state, and over £3,000 was promised in the room towards the cost.

The Ipswich Fine Art Exhibition, recently closed has been a success. The amount already realised is £600, and the number of pictures sold was 162. The visitors were more numerous than those of last year by about a thousand.

A new Wesleyan chapel was recently opened at Banff. It is Gothic in style, and measures internally 55ft. by 29ft. 6in., accommodating 259 worshippers. At the rear are a session house and hall. The buildings were designed by Mr. Ormiston, of Edinburgh, and have cost about £1,200.

At the Hartlepool County Petty Sessions, last week, a case was heard which tested the right of local authorities to charge upon tenants the cost of the water supply, when that previously existing had been found sufficient. After hearing the case fully, the bench made an order for the payment of the amount, with costs.

Mr. Joseph Smith, of Cricklade, has been elected surveyor of that town in succession to the late Mr. George Fawkes, who for many years held the appointment.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

MEETINGS FOR THE ENSUING WEEK.

- MONDAY.**—Society of Arts, Canto Lecture, No. V. "Dwelling Houses: Their Sanitary Construction and Arrangements," by Dr. Cortfield. 8 p.m.
Institution of Surveyors.—Paper by H. J. Castle, sen., on "Contributive Values." 8 p.m.
- TUESDAY.**—Society of Arts. Paper by Jas. Bradshaw, of Manchester, on "Africa, or Paramount Necessity for the Future Prosperity of the Leading Industries of England." 8 p.m.
- WEDNESDAY.**—Society of Arts. W. Mattieu Williams on "Econometrical Gardens for Londoners." 8 p.m.
British Archaeological Association. Papers by H. Syer Cuming on "Ancient Thimbles," and by Rev. Prebendary Seath on "Roman Inscription found at Bath." 8 p.m.
- THURSDAY.**—Society for the Fine Arts. S. W. Kershaw on "Early Art in Books and Manuscripts." 8 p.m.
- SATURDAY.**—Royal Institution. Seymour Hayden on "Etching."

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"And will, in our opinion, supersede any other similar system before the public."—*Building News*.

"It seems to meet the end in view more nearly than anything we have seen yet."—*The Field*.

"7, Mark-lane, London, Nov. 14, 1878.

"Dear Sir,—I cannot see what testimonial you can require from me than the fact that I have taken off all my putty glazing and removed Rendie's work to replace it with yours; any one seeing the two systems would say that yours is far the superior, and that nothing yet out can touch it.—Yours, W. R. PATERSON. T. W. Helliwell, Esq., Brighouse."

For Estimates, Drawings, or Particulars, apply to the Patentee,

T. W. HELLIWELL, Brighouse, Yorkshire;

or, 19, Parliament-street, London.—[ADVT.]

WHITLAND ABBEY GREEN SLATES

These SLATES are of a grey green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the Managers, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

Holloway's Pills and Ointment present the readiest and most reasonable means of removing hereditary, constitutional, and chronic disorder, associated with impure blood and unhealthy skin. Scoury, scorbutic affections, unseemly eruptions, enlarged glands, and other blemishes, yield to these purifying remedies, which eradicate the seeds of the complaint, and avert mischief.—[ADVT.]

HIGH-CLASS VARNISHES.

READER BROTHERS, Tower Varnish Works, Wolverhampton, respectfully invite attention to their Varnishes for House Painters, Decorators, and Builders, which will be found of uniform excellence, and for elasticity, lustre, and durability all that can be desired. They would direct special attention to their Extra Hard-Drying Varnishes for church seats, and seats of schools and public buildings, which for hard-drying, brilliancy and wear are unsurpassed.—[ADVT.]

A new public building, to be known as the St. George's Hall, is about to be built at Kendal from the designs of Mr. John Thompson. The contracts of Messrs. D. and J. Thoms, builders, and of Messrs. Thwaites and Son, joiners, have been accepted for the erection of the building.

The public inauguration of an additional water supply for the town of Leven, N.B., took place on Saturday.

Trade News.

WAGES MOVEMENT.

BELFAST.—The master builders, on the 1st of August last, gave notice that they would reduce the wages of the stonecutters by 2s. 3d. per week, the proposed reduction to take effect on the 1st of November. Taking into account the extreme depression of trade and other circumstances, the men assented to the masters' proposition, and the reduction was accordingly made. It appears that shortly afterwards another notice was served on the stonecutters, intimating that the master builders had resolved to make a further reduction of 2s. 3d. per week in their wages, the notice to expire on the 1st of March. On Friday week the notice expired; but a threatened dispute was averted by concessions being made on both sides, whereby a present reduction of $\frac{1}{2}$ d. an hour was agreed to and extension of boundary, with a prospective reduction of $\frac{1}{2}$ d. per hour at the expiry of another three months. The men accordingly agree to accept 7d. per hour until the 1st of June, when they will receive 6 $\frac{1}{2}$ d. per hour, fifty-four hours being the working week.

DUNFERMLINE.—The Dunfermline operative masons have now resumed work on the masters' terms—viz., 6d. per hour. Within the last six months they have been compelled to accept three reductions of wages, ranging from 9d. to 6d. per hour.

NORTH WALES SLATE TRADE.—After many months of almost unparalleled slackness a slight improvement is at last perceptible in the slate trade of North Wales. At Mr. Assheton Smith's quarries at Llanberis, where some 6,000 hands are employed, the working days have this week been extended from three to four, and it is hoped that at the next monthly letting, this day week, there will be a further extension of a day, if not full time. At Lord Penrhyn's Bethesda quarries the working days are still restricted to four weekly, but the orders for shipments at Bangor Port, Carnarvon, and Port Madoc, the outlet for the Festiniog quarrying district, are increasing. Many quarrymen are availing themselves of the pecuniary assistance extended by the North Wales Quarrymen's Union to intending emigrants.

PERTH.—Intimation has been received by a number of painters in Perth that their wages are to be advanced from 6d. to 6 $\frac{1}{2}$ d. per hour. The slaters have commenced work at a reduction of $\frac{1}{2}$ d. per hour.

Doulting Freestone and Ham Hill Stone

of best quality. Prices, delivered at any part of the United Kingdom, given on application to

CHARLES FRANK,

Norton-sub-Hamdon, Ilminster, Somerset.

Agent: Mr. E. CRICKMAY, 4, Agar-street, London, W.C.—[ADVT.]

TENDERS

BRADFORD.—For the erection of an iron bridge over the Lancashire and Yorkshire Railway, at Ripley-street, for the town council of Bradford:—

Woodiwise, Isaac (accepted) ... £447 2 3

BRADFORD.—For the construction of a sewer and road at Oak-lane, for the Bradford Town Council:—

Smith and Carter (accepted) ... £949 15 4

BENACRE.—For Benacre Rectory, Suffolk. Mr. R. Makilwaine Phipson, F.S.A., architect and diocesan surveyor:—

Cornish and Gaymer	...	...	£2,087 0 0
Downing	...	...	2,016 0 0
Morris	...	...	1,940 0 0
Hawes	...	...	1,820 0 0
Grimwood (accepted)	...	...	1,755 0 0

BOURNEMOUTH.—For new Congregational Church at East Cliff, Bournemouth. Messrs. Kemp, Welch, and Pinder, architects:—

Stroud	...	...	£6,274 0 0
Minty	...	...	5,600 0 0
George	...	...	4,689 0 0
Sharland and Griffin	...	...	4,975 0 0
Lawson and Stanley	...	...	4,398 15 0
Brown	...	...	4,200 0 0
Pike (accepted)	...	...	4,013 0 0

DUBLIN.—For additions to Blackheath, Clontarf, for Gibson Black, Esq. Mr. Thomas Drew, R.H.A., architect. Quantities by Messrs. Patterson and Kempster:—

Millard, T.	...	...	£3,794 16 8
(No credit for old materials.)			
Collen Bros.	...	...	3,635 18 0
Beckett, J. and W.	...	...	3,600 0 0
Pemberton, T.	...	...	3,600 0 0

ELLAND.—For the curbing, channelling, and repairing of James-street, for the Local Board of Elland, West Riding of Yorkshire. Mr. Richard Horsfall, surveyor:—

Jagger, S. and W. (accepted) ... £294 0 0

[Lowest of eight tenders received, of which the highest amounted to £412 10s. 8d.]

HASTINGS.—For new roads, sewers, &c., at West Hill, Hastings, for G. Clement, and A. L. Sayer, Esqs. Messrs. Cross and Wells, and A. G. Colpoys, Hastings and St. Leonards, architects. Quantities by Messrs. Cross and Wells:—

King	...	...	£1,400 0 0
Longhurst	...	...	1,312 0 0

NOTTING HILL.—For the erection of an infirmary at Notting Hill for the guardians of St. Marylebone. The whole of the works to be executed in two years. Messrs. H. Saxon Snell and Sons, 22, Southampton-buildings, W.C., architects:—

Mowlem and Co.	...	...	£117,343 0 0
Braid and Co.	...	...	116,850 0 0
Lovett, H.	...	...	115,760 0 0
Perry and Co.	...	...	115,000 0 0
Cowland, Bros.	...	...	113,915 0 0
Crockett, W.	...	...	113,794 0 0
Shaw, G.	...	...	110,875 0 0
Wall, Bros., (accepted)	...	...	109,000 0 0
Chappell, J. T.	...	...	108,860 0 0

KENSAL NEW TOWN.—For making up the roadways of Lancelfield, Herries, Beethoven, Mozart, and Dart-streets, Kensal New Town, for the Chelsea Vestry:—

Matthews, Wm., of Westbourne-park (accepted) ... £2,865 0 0

[Five tenders were received, of which the highest was £4,555, and the lowest the one accepted.]

KENLEY.—For alterations and additions to a house at Kenley near Caterham. Mr. Horace T. Bonner, Lewis-ham, S.E., architect:—

Burman	...	...	£950 0 0
Kirk, G.	...	...	835 0 0
MacCowan	...	...	830 0 0
Higgs	...	...	797 0 0

LADYWELL.—For factory and stabling, Ladywell, S.E. Mr. Horace T. Bonner, Lewisham, architect:—

Somerville and Hill	...	...	£987 0 0
Hart	...	...	972 0 0
Staines and Son	...	...	936 0 0
Burman	...	...	910 0 0
Kirk, G.	...	...	875 0 0
Smeaton	...	...	859 0 0
Jerrard	...	...	847 0 0

LONDON.—For repairs at the Licensed Victuallers' Asylum, Old Kent-road. Mr. W. Hurran, Chairman.

Mr. W. F. Potter, architect:—

Pritchard, W. H.	£367 10 0
Wood, B. T.	365 0 0
Butler, G. W.	322 0 0
Hayworth, S.	284 0 0
F. Hersee (accepted)	258 9 0

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THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 21, 1879.

GOTHIC ARCHITECTURE IN THE CITY.

GOTHIC architecture still enjoys popularity in our City street buildings. If it has recently given place, in many instances, to a style which conforms more readily to real or supposed business wants, or to the prevailing fashion for "picturesqueness," it still continues to assert itself. In Moorgate-street, at the corner of London Wall, a large and costly pile of offices have lately been erected in the Venetian-Gothic style. There are certainly few streets in the City which are less interesting generally as regards architecture, altogether lacking historical associations, and possessing no striking modern buildings. Anything vigorous and racy is a relief, and the architect of the building we have mentioned (Mr. Bradbear) has evidently been led to this conclusion. Tower Chambers, as the block of offices is called, is a somewhat florid structure, of a type common in Manchester and the United States. The two fronts, of stone, are enriched by a specious kind of ornamentation, in which the windows, with red granite shafts, vary from the flat segment to the lancet pointed trefoil. Polished red shafts, supported on carved corbels, adorn the upper story, which is crowned by a lofty iron cresting of showy design. The corner, which is circular, is finished by a lofty entablature of pointed form, covered with zinc. In the façades we have an astonishing variety in the fenestration. The ground story, to be let as shops, is divided by pilasters carrying flat moulded arches, or, rather, apologies for arches. We cannot imagine why square heads were not used, seeing that the arches are of very slight camber, apparently pointed segments. The circular corner, however, is spanned in one opening after a truly acrobatic fashion; we presume it is stable, though it certainly does not look so; and we can only describe it by asking our readers to imagine a very flat pointed arch of stone, about 10ft. wide, constructed over a window circular on plan. Of course it is not the fault of the arch that it looks exceedingly weak under a tower of smaller openings, with their piers and mullions resting upon it. A singular absence of gradation marks the upper story windows. The first floor have lights in pairs inclosed by pointed arches of segmental form, the tympana of which are strangely cut by a straight label member. The next tier of windows are square-headed trefoils, and the upper ones acutely pointed trefoiled; all have jamb shafts of red Aberdeen. But the centre bays on each front are quite unlike the others; the first-floor windows have profusely carved trefoil-headed tympana, above which is an oriel supported on winged dragons, the effect of which is extremely crowded and incoherent in the upper stories. The oriel looks crushing over the elaborate three-light windows below, and there is a painful want of connection and congruity in the design. All this is intensified by a whimsical variety of ornament in the parapet, the pattern of which displays two very different kinds of panelling, one round and the other square. The only reflection, after looking at such an amazing effort to produce diversity is, that Venetian Gothic has its votaries who prefer redundancy to moderation, profusion and luxuriant detail to chasteness or refined elegance. But we meet with the taste in other buildings of the style. In the plethora of florid ornament, carving and colour characteristic of

the style resides its very recommendation to the taste of the many. The sterner forms of Northern Gothic have never taken the firm root of the more ornate species, or that which Mr. Ruskin has aptly, in his "Stones of Venice," designated as the "efflorescence of decay." We see nowhere in these Gothic effusions of style the all-pervading unity in variety which is the peculiar property of true architecture—everything is frittered or carved to gratify an ill-tempered fancy, and the carver's conceits are as fulsome as they are feeble. To return to Tower Chambers, the building internally is arranged with a central hall and stone staircase, with an iron scroll balustrade of "loud" design, and this feature is certainly not improved by the very bizarre coloured glass in the flat fanlight at the top. The pointed arches and capitals, in which the carver has done his best to advertise his art, are we cannot say of such a kind that we should wish to see the style more largely employed. The floors are let as offices, and from the very convenient position of the building will speedily be let, the rents varying from £25 on the third-floor for small rooms, to £250 for the corner room on the first-floor.

In Aldersgate-street, at the corner of Long-lane, another important structure in a Gothic dress is in progress, from the designs of Messrs. Bateman and Corser. It is destined for the "Manchester Hotel," being undertaken by the Manchester Hotel Company. In this case a less pretentious and more national kind of Gothic has been chosen, namely, the Tudor—red brick, with stone in the windows and dressings, being employed. As to the selection of style, we need but confess that Late Gothic, despite its vagaries and weaknesses, has more claim to be employed for an hotel than any other earlier phase; its forms, features, and ornamentation adapt themselves well to domestic requirements, and we are not obliged to submit to such an extravagant or capricious feature as a row of sharply-pointed arches, the apices of which very uncomfortably rest below a level stair's landing, and the foliage of whose caps threaten to knock one's head or hat every time one of the rooms is entered. Confining our remarks to the exterior, we may say that the building occupies an important corner block opposite the Aldersgate Street Metropolitan Railway Station, a bold rounded corner joining the two fronts. The ground story forms an arcaded row of what is intended for shops; here the panelling in spandrels and the carving in caps have an evidently weak appearance. The first, second, and third floor windows form vertical bays, separated by strings and panel-work, and small balconettes to the third story windows. The windows are two-light and have traceried heads, the third-floor range being pointed with tracery of Perpendicular character. The upper row are square label-headed, with ogee-curved under-arches to the lights. There are two tiers of dormers; the lowest tier rising above the cornice and parapet. It would have been, perhaps, more correct, if not agreeable to the eye, if the whole of the four main windows had been connected vertically instead of showing pointed arches over those of the third floor. Angle stone buttresses, forming pinnacles, flank the lower windows; these and the drops to the carved stone corbels of balconettes, and the gable pinnacles, are a trifle over-florid, if not weak—a quality that strikes us in the detail generally. At the angle a projecting oriel, four stories in height, appears, and the angle roof will be pronounced by a clock turret. There is an evident weakness in the ground-story treatment towards Aldersgate-street and Long-lane. Internally the work is not sufficiently advanced to allow us to form any opinion of the architectural result; though there will be large coffee and smoking rooms

on the ground floor and the customary accommodation provided in large hotels. A stone stairs of geometrical design is provided in the centre of building, with lifts adjoining.

CONCRETE PIPES.

A PAMPHLET just issued by Messrs. E. and F. N. Spon throws some light upon the vexed question of the use of concrete pipes at Bournemouth. It consists of a series of reports, the last of which is dated 27th January, 1879. The concrete pipes are 2ft. diameter, and were laid in the winter of 1877. In the report of Mr. Creeke, the consulting surveyor to the Bournemouth Improvement Commissioners, the thickness of the pipes is stated to be 1½in. In another report, the thickness is said to be 1½in., and in another 1½in. Perhaps it is best to take the thickness as being 1½in., as Mr. Creeke gives it, he being the official person concerned.

We have heard from time to time, during the last twelve months, amusing stories of how the laying of this sewer was being superintended by a committee from the Board, and of differences of opinion on questions of engineering practice; but none of these appear in the pamphlet before us, written by Messrs. Henry Sharp, Jones, and Co., the makers of the concrete pipes, who have taken a more dignified view of the case than to refer, even, to any such proceedings, beyond saying that their effect has been unfortunate to them and detrimental to the ratepayers of Bournemouth. They have been induced to vindicate in this pamphlet the manufacture and use of concrete pipes for sewage purposes, and to put the facts before the public in the hope that not only the quality and character of their rock concrete tubes will be understood, but that they themselves will be justified against the charge that they represent their manufactures to be that which they are not found to be in practice. They do not insinuate any malevolent intention on the part of the Commissioners or their advisers in refusing to continue the use of the concrete pipes; but they express extreme regret that the Commissioners should have condemned in such unqualified terms the kind of pipes which their own surveyor recommended to them—a kind of pipes, moreover, which the inspector of the Local Government Board who held the preliminary inquiry was aware the Improvement Commissioners intended to use, and who remarked that such pipes were being extensively used in other parts of the country for sewerage purposes.

After the pipes had been laid in Knyveton-road, the sewer was required (for some reason not stated) to be laid at a lower level, and they were uncovered, and many of them were found to be broken—split longitudinally. Then came guesses at the cause of this. Was it the nature of the materials of which the pipes were made? That seems to have been the first guess, and some pieces of a broken pipe were sent to Mr. Henry Reid, consulting engineer and chemist, for his opinion as to their durability, meaning thereby their durability at Bournemouth, where it is said the water contains no lime; but, as Mr. Reid exceeded his instructions, and proceeded to inquire into the process of manufacture, and to test the capacity of the concrete pipes to resist any mechanical shock or wear to which they might be subjected, the Commissioners did not receive his report kindly. They asked for reports from Mr. Donaldson, of Reading, and Mr. Ponton, of Parkstone, Dorset, who both reported unfavourably of the concrete pipes.

Mr. Creeke states the conclusions he has arrived at, after seeing the pipes taken out of the trench in Knyveton-road, premising that he reports under a full apprehension that his conclusions will be subjected to

criticism, both by local practical men and by many of his own profession, for the issues, he says, are of very considerable professional and commercial moment: and he feels also his own responsibility to the Board. After stating his conclusions, he thinks the Board fully justified in withdrawing from the further use of these pipes; but, very curiously, and seemingly contradictorily, he takes five of the worst of the concrete pipes which were taken out of the trench whole, and five of the best salt-glazed stoneware pipes, and submits all to the test of weight saddled upon them, and found that the stoneware pipes bore 2,481 lb., and the concrete pipes 2,814 lb., showing the concrete pipes to be 13 per cent. stronger than the stoneware. The use of concrete for sewer pipes has, indeed, engaged Mr. Creeke's attention for some years, and it was after very considerable investigation as to the manufacture and testing in all its stages that he adopted it. For the purpose of decreasing the weight and cost of the pipes at Bournemouth, the thickness had been reduced to 1½ in., instead of keeping to the rule of 1-12th of the diameter, which would have been 2 in. for the pipes used there.

The makers of the pipes, Messrs. Henry Sharp, Jones, and Co., consulted Mr. Lemon, of Southampton, and Mr. Ellice-Clark, of Hove, as to the quality of their concrete pipes, and their suitability for sewerage purposes; and as to the cause of their failure at Bournemouth. The reports of both these engineers are much more satisfactory to us—and we doubt not will be so to all who are equally impartial in their view of the question—than are those of either Mr. Donaldson or Mr. Ponton. Their mode of testing the pipes—that is, by dead weight—is more in accordance with the actual conditions of a sewer than is that adopted by Mr. Donaldson—that is, by impact. Mr. Creeke also applied the dead weight test, and, except in the primary fault of the pipes being too thin, we cannot see that he is in any way in error.

Lastly, Mr. Reid makes a report to the manufacturers of the pipes, giving the results of his tests of the tensile and crushing strength of the material, together with some remarks on sand, &c.

Now, it is to be observed that all these concrete pipes failed by cracking longitudinally, and stoneware and fireclay pipes have sometimes failed in the same way; and we do not think that the cause of failure of these pipes at Bournemouth has been discovered.

ARCHITECTURAL MOSAIC.

I.—ANCIENT MOSAIC.

FORTY years ago Mosaic might have been reckoned among the lost arts so far as this country was concerned. It was treated as a subject of curious archaeological study, and considerable interest of a dilettanti kind was taken in it, but of English Mosaic there was absolutely none, nor had there been for centuries. The latest examples then known, dated back to the period of the great Medieval art revival about the time of Henry III., and even then, as we pointed out in a recent article, the art was a sickly kind of exotic, practised chiefly with imported materials and by foreign workmen. The modern revival of the art commenced in the year 1829, with an extensive and elaborate inlaid pavement by Mr. Blashfield, after designs furnished by H. S. Hope, Esq., at whose country seat, Deepdene, in Surrey, it was laid down. This pavement was formed of asphalt, coloured cement, and Venetian pisé work. In the same year, Mr. Singer, of Vauxhall, obtained a patent for a mode of forming tesserae by cutting with a wire apparatus pieces of the required form out of thin layers of clay, which were afterwards dried and baked in the usual way;

and in the next year (1840) Mr. Prosser, of Birmingham, discovered the now well-known "dry process," whereby a semi-vitrified substance of extraordinary hardness and density was produced by the pressure of powdered flint and clay between powerful steel dies. Prosser's process was at first applied to the manufacture of buttons by Messrs. Minton & Co.; but afterwards, at Mr. Blashfield's suggestion, to mosaic tesserae in various colours and forms. A new method of combining the tesserae into patterns, by placing them face downwards on a smooth surface and cementing the backs in sections of convenient size, was also introduced by Mr. Singer at the same time. The principal pavements executed about that period were in the hall of the Reform Club, in Pall Mall, and in the house of the Society of Arts, Adelphi. Mr. Herbert Minton took a very great interest in improving and extending the new manufacture, employing Mr. Owen Jones and Sir Matthew Digby Wyatt as designers, and since that time the art has improved to such an extent that modern work now fully equals, and even surpasses, that of the ancients. Modern mosaic, however, is so entirely a revival of the ancient that it can only be explained by reference to old examples and an account of the various processes in use at different epochs of its development.

In what country, or at what period, the art originated it is difficult to say. In the Egyptian Department of the British Museum there are some mosaic tesserae, and portions of the capital of a column with inlaid mosaic work, recently brought from a building at Tel-el-Yahoudeh, which is said to be of the time of Ramesses II., or, at all events, of far earlier date than the time of the Ptolemies, which has hitherto been said to have afforded the earliest specimens of Egyptian mosaic. There are also, in the Assyrian Department, examples of small mosaic work inlaid in ivory ornaments, from Nimroud, but they are mostly of Egyptian type. Hence we may infer that the art originated in Egypt, and was thence transmitted to the East. That it was known in ancient Persia we learn from the Book of Esther (chap. i. v. 6), which speaks of mosaic pavements in the palace of Ahasuerus, which, according to the marginal rendering, were of porphyry, marble, alabaster, and stone of blue colour—probably lapis lazuli—shaped specimens of which, that had been used for mosaic inlay, are to be seen among the Assyrian ornaments just referred to. The Greeks learned the art in the East, probably during their various Persian expeditions, and afterwards carried it to the highest pitch of excellence. In the days of Alexander, mosaic pavements of coloured marble were common throughout Greece, the floors being as elaborately decorated as the ceilings and walls, a fashion which gave rise to the story related by Claudius Galenus of Diogenes the Cynic, who walking across the pavement of a private house in Athens, whereon were depicted all the gods of Olympus, coolly turned round and expectorated in the face of the owner, with the left-handed compliment that it was the least noble spot he could find in the house for such a purpose. Mosaic is spoken of as *lithostrotion* by Hesiod and Sophocles, and *lithologemena* by Xenophon, the term *moussion*, whence the Latin *musivus*, and the modern *mosaic*, coming into use much later. Pliny mentions several Greek mosaic artists of great celebrity, particularly Sosos of Pergamos, but no original specimens of their work have survived to the present day. An ancient Roman copy of the celebrated work of Sosos, known as "Pliny's doves," is to be seen in the museum of the Capitol at Rome. This exquisite and well-known example fully bears out Pliny's high opinion. It represents four doves on the edge of a metal basin, one of which is stooping to drink, and the shadows, reflections in the

water, plumage, heads, and expressive eyes, are all depicted in minute mosaic work in the most beautiful and natural manner. The only other Greek mosaic now existing is a pavement discovered in 1763 at a villa near Pompeii, bearing the name of Dioscorides, of Samos, but it seems to have been only a copy of his design.

The art of mosaic was first introduced to Rome by Sylla about the year 80 B.C., when he returned home laden with the spoils of Greece and the East. It took the Roman fancy amazingly, and grew into surprising popularity, arriving at its highest perfection in the time of Hadrian, A.D. 117 to 138, and decayed at last only as the Roman empire itself decayed. During the reigns of the twelve Cæsars the workers in mosaic are said to have been among the most honoured artificers in the city of Rome, and no house or building of any importance was without its mosaic. Cicero describes the pavement of his own house as *lithostrotum*; Seneca said that he should indeed consider himself poor and sordid if the walls of his house were not adorned with mosaic, Julius Cæsar, according to Suetonius, carried a mosaic pavement with him, to adorn his tent, through all his campaigns and progresses, and wherever the Romans settled themselves, in Africa, Spain, France, Britain, or the East, they carried the art with them, employing materials found or manufactured in the respective countries, when the marbles, or fictile tesserae, of their own land were not attainable. The following is a brief description of the several kinds of Mosaic work in use among the ancient Romans:—

1. **OPUS TESSELLATUM**, or Tesselated work.—This was the most ancient kind, and was generally employed for pavements, very rarely, indeed, for walls. It consisted of small cubes of marble, seldom averaging more than $\frac{3}{4}$ of an inch square, each of which had to be sawn or worked by hand into the shape required by the pattern. This was nearly always geometrical in design, worked out with the Greek fret and many other ornamental combinations. The colours employed at first were probably chiefly black, white, and red; but blue and yellow were generally introduced subsequently to the invention of the *Opus Figlinum*. The best examples are at Pompeii, in the Sala of the Nuovo Braccio in the Vatican, and in the Baths of Caracalla, at Rome.

2. **OPUS SECTILE**, or Sectile work.—This was employed exclusively for pavements, and was composed of large thin slices of marble, not of little cubes. It depended for its effect, not upon the production of any particular design, but solely on the shape, colour, and vein of the marbles employed. Owing to the extreme costliness of the materials, it was very seldom employed, and no examples are known out of Italy. The most noble specimen of it now existing is the pavement of the Pantheon at Rome, built by Agrippa, 27 B.C. In this splendid pavement the slices of marble are very large, porphyry, giallo-antico, and pavonazetto being the principal marbles employed. They are arranged simply in round and square slabs alternately.

3. **OPUS FIGLINUM**, or Fictile work.—After the two former kinds had been for some time in use for pavements, a desire arose to employ mosaic as a decoration for the walls and curved surfaces of buildings. But for this purpose marble was often too costly, and did not possess sufficient variety of colour for the more elaborate designs, hence the necessity for an artificial, or fictile, material. This was a vitreous substance, composed of silex and alumina, but with a larger proportion of silex than is used in modern times, and was coloured by one or other of the metallic oxides. In the provinces of the Roman Empire ceramic tesserae were formed of the various clays of the neighbourhood, as for example, the fine

mosaic at Woodchester, the most elaborate discovered in this country, was constructed with tesserae made from clays now found in the neighbourhood of Gloucester and the Forest of Dean. The vitreous material was also gilded by covering a thin film of leaf gold, spread over the material, with a thin plate of transparent glass, or with a fusible mixture, and fixing the whole by heat. The advantages of fictile tesserae over marble were (1), Greater variety of colour; (2) Facility of working; (3) Cheapness; (4) Endurance of polish and brilliancy; and hence the *Opus Figlinum* soon almost superseded the former kinds of mosaic, and "glassy walls," *cum aureo superinducto*, overlaid with gold, became quite common, and were treated by the writers of the times as signs of too great luxury. Many examples of gilded mosaic have been found at Pompeii, perfectly well made, as pure in colouring, and as little obscured as when they were executed.

4. *OPUS VERMICULATUM*, or Curvilinear work, with its three subdivisions of Major, Medium, and Minor work, constituted the full development and perfection of the ancient mosaic. In this style mosaic took its place as one of the fine arts, and aimed at the direct imitation of all kinds of figures, ornaments and pictures, in their true shades, colours, and reflexes, and used both marbles and fictile tesserae, adding even jewels and precious stones when necessary, to heighten the effect. The *Major* work was used in large pavements, or ceilings, and presented mythological figures, gods, geni, &c., with various ornaments on a colossal scale. The cubes were of large size, not always square, but more often so than in the smaller styles, and the workmanship was coarse and rough. It was also employed in combination with finer work, for filling in the flat tints and large draperies. The surfaces, too, were usually left unpolished, being merely rubbed down. Most of the ancient mosaics found in this country are of this class, and the student should be cautioned that they by no means afford the best specimens of the ancient art; their workmanship being rough, and their manufactured tesserae comparatively soft. They owe their long endurance partly to the extreme solidity of their foundations, and to their having been buried out of the way of wear and injury for ages. The *Medium* work was much finer, and was used for subjects requiring greater delicacy and softness of treatment. The cubes were smaller, and the workmanship finer. It was sometimes used for pavements, but mostly for walls. Fine examples are found at Pompeii. The *Minor* work was the finest and most elaborate of mosaics. It was used for portable pictures and for personal ornaments. Many of the strips were less than 1-20th of an inch across, and even smaller. It was finished with most minute nicety, highly polished, and rivalled even painting itself.

Besides the above principal kinds of ancient mosaic there were others of a peculiar and subordinate kind, among which may be mentioned that called by Pliny, "the unswept floor." This was confined to the triclinium, or dining apartment, of dwellings, and represented the fragments of a feast which might have fallen down, and been left scattered on the ground in the utmost confusion. Pliny ascribes it to a Greek designer, in which case it is one of the few examples of bad taste produced by that nation. Another kind was the "*Opus incertum*," in which all kinds of marble were put together in an irregular shape, knitted into a mass with cement, laid upon the floor prepared to receive them, and reduced to a polished face by friction. They formed a handsome and durable pavement, resembling Venetian *pisé* and Italian *trazzo* floors, as used at the present day. Another most eccentric kind was the endeavour to apply mosaic to figures

in relief. A rude mezzo-relievo figure was formed, covered with plaster; and then portions of the surface were gradually chipped away, and their places filled with delicate tessellation. Very few specimens of this are to be met with.

The following were the ancient mechanical processes:—In laying mosaic pavements, great care was taken to form a solid foundation. The ground having been excavated to the necessary depth, a layer of large flint-stones, with but little cement, was first placed upon it, and above that a course of concrete, composed of smaller stones and lime, in proportion of 5 to 2, which was beaten and pressed down with great care until its thickness was reduced from about one foot to 9 inches. This process of beating was called "*rudratio*," and the stratum itself "*rudus*." Above the *rudus* was a third layer, called the "*nucleus*," which consisted of a kind of cement, composed of one part lime to three of crushed brick, pottery, &c. This was worked to a true face, and upon it was drawn the outline of the intended pattern. Then the tesserae were placed in their proper positions, and liquid cement poured over the whole, so as perfectly to fill up the interstices between the cubes. After the superfluous cement had been removed, all slight inequalities were reduced by friction with pieces of marble, and the whole was brought to one uniform surface.

For wall and vault decoration, after a smooth-keyed surface had been properly prepared, the tesserae were fixed with a cement called *marmoratum*, applied in small portions at a time, composed of slaked lime and powdered marble in the proportions of one to three, and blended with water and the white of eggs. This was intensely hard and very fine, but had the disadvantage of setting almost immediately after its application, which rendered it impossible to displace any of the work, even for alterations during its construction, without destroying the whole.

W. H. R.

AUCTIONEERS: THEIR DUTIES AND LIABILITIES.*

AUCTIONEERING, or the duties and liabilities of auctioneers, is scarcely a theme upon which we could expect much that was interesting said, but a work upon our table, by Mr. Robert Squibbs, auctioneer, just published by Messrs. Crosby Lockwood and Co., entirely and agreeably disappoints any such anticipations. Mr. Squibbs' aim, according to his preface, is "to produce a book of semi-legal character for auctioneers and their pupils," and to discuss the business relations of the auctioneer with the solicitor or his client, as well as his duties and liabilities to the purchaser. From a general perusal of the book we think the author has earned the gratitude of at least the pupil, if not of the young auctioneer, by divesting the usually dry forms and business routine of the profession of the dulness and repetition which might have been thought inseparable from them. Mr. Squibbs has thrown in here and there observations, incidents, and allusions which help to make the book very readable—though without detracting from its usefulness as a text-book. Quotations from, and references to, law reports and other legal publications are amply furnished, and we see an index of cases is prefixed that will be of much value to the student. Plunging into the work in *medias res*, we find some valuable advice is given, alike necessary to the auctioneer and to the purchaser or his agent. Thus it should be known that the power of the auctioneer to bind a purchaser does not extend beyond the auction, so if the auctioneer enters into a contract for sale of

unsold lots he should obtain the purchaser's or his agent's signature to the sale-book as evidence of the bargain; again Baron Park ruled in *Davis v. Danks*, that the auctioneer "has a special property, as bailee, in goods and chattels which are put into his possession for the purpose of sale, whether such are in his own rooms or in the house of another person." It may not be generally known also, that an auctioneer is liable for a misdescription of property. Thus, in *Parker v. Farcbrother*, the defendants, in their particulars, incorrectly described a house as having three floors, and another as in every respect similar to a number described. The houses were all bought by one man, who after the sale claimed compensation, though he lived next door. This was paid. The vendor sued the defendants, and the jury gave a verdict for the purchaser. In general, wrong particulars or mistakes are construed in favour of purchaser. A very interesting chapter is that on "Particulars of Sale," exposing in a humorous manner many of the tricks of auctioneers' catalogues, and the weaknesses of purchasers. Mr. Squibbs recommends the older forms of particulars of sale to auctioneers of the present day, who are apt to exercise their powers of description in a rather exaggerated manner. The author justly remarks, "Auctioneers may rush away into ecstasy over points of attraction, extent, and configuration, beautifully timbered miniature parks, and bijou residences, meandering streams, and Gothic facades, rich loamy or dry gravels, and everything else which may, in their eye, tend to attract the public in search of an investment, yet it must not be imagined that the beauty and admiration exist only in the eye of the auctioneer." In the old days, when a large estate was advertised, the auctioneer addressed himself to the wealthy landed proprietor or rich merchant, who could boast of splendid genealogies. Now all is changed; wealth is scattered, and there are many who, as the author tells us, are equally as susceptible as the auctioneer of attractive descriptions. Names go a long way with many people, and some euphonious title, "Orchardlea," or "Great Allington Manor," turns out to be a very unassuming, if not undignified, farmhouse. Mr. Squibbs recounts numerous instances of the perfidy of his craft: how many glancing down auctioneer's registers of properties find them out of the way, or inaccessible. The descriptive diction of the auctioneer as regards "residential freeholds," is often, we know, both inaccurate and contemptible, and tradition and the fancies of imaginative proprietors are often called upon to give an attractiveness to a property. "Society" and "Position" are often caught at in selecting a house near town; but, as the author says, "a noble town mansion" may mean many things, and may be considerably below the estimate formed of it in the eyes of the investor. Many amusing incidents enliven this chapter, but it may be sufficient to observe that these high-flown descriptions of houses comply with the taste of a certain section of the public, and that an auctioneer has to cater to this taste as much as the architect. The "ivy-mantled Gothic tower" or the ancestral hall of the Stuart age, even a Jacobean touch in the details, will redeem a multitude of vices in some minds. It is very necessary in particulars of sale, that the vendor discloses everything connected with the estate. In *Basecomb v. Beckwith*, an important issue was raised. The sale was subject to a condition that no public-house should be built or carried on upon the property. The defendant purchased on this condition certain lots coloured on plan, another excepted portion having been reserved by the vendor for the purpose of building a public-house. The Master of the Rolls, in commenting upon the evidence, thought the plaintiff could not compel the

* Auctioneers: Their Duties and Liabilities. By ROBERT SQUIBBS, Auctioneer. London: Crosby Lockwood and Co., Stationers' Hall-court.

defendant to execute the contract, if he insisted on retaining a certain plot free from any restrictive covenants. He also thought the conditions were not truthful, and that they ought to have fully disclosed everything where a specific performance of contract was required. In another chapter on "Conditions of Sale," the question as to whether the auctioneer or solicitor should draw these up is raised. No doubt, the auctioneer by their preparation undertakes grave duties and responsibilities, and it is very necessary he should limit the extent of his liabilities. The purchaser is, of course, entitled to a full investigation of the vendor's title, and the conditions of sale should afford him the fullest means of inquiry. The abstract of title of vendor is examined in the usual way by the purchaser's solicitor, who makes a list of "requisitions" or objections, and if any omission arises on his part the law holds him liable. If the auctioneer prepares conditions, the law would similarly hold him responsible for any omissions. Questions of light, drainage, right of way, or any other easements, are particularly necessary, and ought to be mentioned. On the subject of "Valuing," a few useful hints are given. The market value, though generally taken, is not always the real worth of a thing. In commonplace properties, the rental may be a test of value, but not always. Various circumstances have to be taken into the consideration of the valuer. The author truly says:—"It is not because a property is specially convenient or desirable to one individual that the sum which he has given is the correct market value. It does not follow that because one individual has given £50,000 for an estate, the annual value of which is £1,500, that that price is the market value." Many other inexplicable reasons exist for a difference of opinion. The valuation of buildings in towns is very uncertain, and the author thinks the "Metropolis Valuation Act, 1869," which provides a basis of value for the purpose of local taxation, may be taken as a useful guide. In speaking of freehold business premises subject to a rack-rent lease for a term of years, the author says, the valuer's safest course would be to estimate the value of the freehold in possession at, 1st, the actual rental, and 2nd, the improved estimated annual value, in each case deducting the value of the tenant's interest under the lease. The several kinds of leaseholds are next gone into, and the varying conditions affecting their value as investments are considered, though it is impossible to lay down any scale that will give the number of years' purchase of the ascertained annual value in all cases—this being a matter upon which the practical knowledge of the valuer and the circumstances of each case must be called to decide. The latter chapters of the book deal with the various other duties of auctioneer, such as collecting rents, effecting insurances, levying distress, arbitration, house agency, &c. Referring to ditches, the law relating to the same is stated. Thus it may bear reiteration, that the maker of a ditch cuts it out of his own land, throwing the soil upon his land, planting a hedge upon it, and therefore the edge of ditch is the legal boundary. "Lights" and "Fixtures" are discussed. Alterations or enlargements do not destroy the old lights, but alterations in position do. It may not be generally known, too, that a right to light may be lost by blocking up windows for one year. The necessity of a schedule of fixtures is urged. A copious index is furnished at the end of Mr. Squibbs' treatise, which will be hailed with satisfaction by all those entering upon the arduous and multifarious duties to which it is a capital introduction.

Mr. Thomas Jones, of New Swindon, has been appointed engineer of the Portland Convict Prison.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the Association was held on Friday evening, the President, Mr. H. L. Florence in the chair; Messrs. P. D. R. Davies, E. J. Rope, A. Beesley, F. Moorhouse, R. Langton Cole, J. A. Marshall, and F. B. Bare were elected as members. Thanks were accorded to Mr. J. O. Scott for permitting the members to visit the new Greek church in Petersburgh-place, and to Messrs. Audsley and Joseph for similar courtesy as to the neighbouring synagogue, and it was announced that the next visit will take place on the 22nd inst. (to-morrow), when the new premises of the Society for Promoting Christian Knowledge, in Northumberland-avenue, will, by permission of Mr. John Gibson, be inspected. The President remarked upon the large proportion of the Institute prizes which had been carried off by members of the Association, the list including Mr. Millard, the winner of the Pugin travelling studentship, and Mr. F. Hemings, who was highly commended in the same competition; Mr. Sayer, Mr. Blagrove, and Mr. F. Pinches, the winners of the Tite, Grissell and Institute medals, and Mr. Vacher, who received honourable mention in the last-mentioned competition.

MEDIEVAL PARIS.

Mr. GEORGE H. BIRCH read a paper on this subject, illustrated by plans of the city and Notre Dame and other principal buildings. The history of Paris was sketched from the conquest of the city, then known as Lutetia, by Cæsar, onwards, the retrospect including a reference to the building by Constantine Chlorus (A.D. 292-306) of a palace, where he and his successor Julian the Apostate lived, and the remains of which are yet to be seen at the Palais des Thermes, in the Hôtel Chamy. References to the Bishops of Paris occur in the ecclesiastical chronicles of the fourth century, and at that period a church dedicated to Our Lady, was built on the island of the city. This church was sumptuously rebuilt by Childebert in the sixth century, and to the latter edifice probably belong the remains discovered in 1847, and preserved in the Palais des Thermes, consisting of portions of mosaic pavement and three columns of Aquitanian marble, one nearly complete with astragal and cap: Childebert also founded the Abbey of St. Victor, afterwards St. Germain des Prés. After Charibert's time Paris was abandoned as a capital in favour of more eastern cities till 888, when Eudes of the Caput line returned to the city. Paris gradually enlarged its borders, and made at length rapid progress under Philippe Auguste, when the faubourgs, suburbs which had sprung up around the chief roads and great abbeys, were for the first time inclosed. A wall bounded with towers and gates was commenced on the north side first, and completed in 1208, and afterwards the south side was taken in hand and completed about the end of Philippe's reign. In all views of Old Paris, the Tour de Nesle forms, said Mr. Birch, a very bold and striking object; the gate next to it is that called the Porte de Buci, then follow in order St. Germain, St. Michael, St. Jacques Papal gate, St. Marcel, St. Victor, and at the point of junction of the wall and the river was probably another tower, similar to that of Nesle; crossing the river end the island of St. Louis, the next is the Tour Barbeau, then follow the gates of St. Paul, Baudoyer, Barbette Braquelde, St. Martin, St. Denis, another not recorded, close to St. Eustache, then Montmartre, Coquillière St. Honoré, ending at the river with a large tower at a corresponding point to the Tour de Nesle, these two towers forming the defences of the bridge at each end. By this arrangement the great tower of the Louvre was excluded; it formed a strong fortification of its own, resembling our own Tower of London. Just as in England our Royal residence was at Westminster, and when abandoned by the sovereign the great courts of justice, over which the monarch was presumed to preside in person, remained; so in Paris, the Palais de Justice is now located where it had been from time immemorial in the ancient Palace of the Kings; La Sainte Chapelle, and a few outer walls, such as the Conciergerie, the Salle des Pas Perdus, the clock tower, and one or two other towers alone now remain of this palace. More fortunate than Westminster, it has preserved its beautiful chapel, while that of St. Stephen's was burnt in the last fire, leaving only the crypt; but Westminster has preserved its

grand hall and cloisters, while the walls only of the great hall of the French palace remain in the present Salle des Pas Perdus. Philippe Auguste, finding that the ancient palace on the island was no longer a convenient or salubrious abode, from the contiguity of houses, built and fortified the great tower of the Louvre (A.D. 1204). It possessed a great central keep, 144ft. in circumference by 96ft. high, and the usual collection of towers and walls forming outer and inner baileys or wards, and was used principally as a State prison. At this period three bridges spanned the Seine,—two ancient ones, Le Grand et le Petit Ponts, and the one built by Charles the Bald. Le Grand Pont, which afterwards received the name of Pont au Change, from the money-changers who fixed their quarters on it (for, like old London Bridge, these Paris ones were all covered with houses), was defended on the right bank by a fortress called the Grand Châlet, while a similar structure on the left bank protected the entrance to the Petit Pont. The Bridge of Notre Dame was first called Pont de la Planchette de Mibray, about which there is the following story. It had been rebuilt in 1413, but gave way 1499, and the Provost of the Merchants, corresponding to our Lord Mayor, was put in prison with the sheriffs for gross carelessness in not looking after the bridge, and taking proper precautions for public safety. Several skilled bridge builders and master-workmen from Tours, Orleans, Amboise, Lyons and other places were called in to give their advice, and to make a representation of a new bridge. But a foreigner, Brother John Jocundus, of Verona, obtained the first premium, and with the co-operation of two Frenchmen carried it out. The Pont St. Michel was the next antiquity. All these preceded the Pont Neuf, not commenced until 1578. The first wharf or quay was commenced in 1312, by order of Philippe le Bel. It extended from the convent of the Augustines to the Tour de Nesle. At the close of the thirteenth century, the churches, parochial and otherwise, but not including the cathedral, the abbeys, and other conventual churches, were thirty-six in number. In the Ile de Cité there were forty-three streets, 292 streets in the quarter of the right bank, seventy-six streets on the left bank, and eight others extra-mural; the number of inhabitants was estimated at 215,861, of whom 11,727 rateable and paying taxes lived on the right bank, 1,241 in the city, and 2,232 on the left bank. Paris was formerly only the seat of a bishop, and so continued from the time of St. Denis to A.D. 1622; it was one of the suffragan sees to the archbishopric of Sens, but Louis XIII. obtained of Pope Gregory XV. a bull erecting it into an archbishopric, which his successor very largely endowed, and created a dukedom and a peerage of France. The Cathedral Church of Our Lady at Paris would alone occupy a whole evening. Reference has before been made to the Basilica, erected by Childebert on the site of a more ancient fabric. Gregory, of Tours, distinctly says that there were two churches very close to one another, one situated on the southern portion of the present cathedral dedicated to St. Stephen the protomartyr, the other, a little to the north-east, to St. Mary. In A.D. 829, the Council of Paris assembled in the nave of that of St. Stephen, which was the larger and more sumptuous of the two. In the twelfth century, Etienne de Garlande, who died 1142, made considerable alterations and additions to the Church of the Blessed Virgin, and Suger, Abbot of St. Denis, adorned it with some magnificent stained glass, and it gradually eclipsed in splendour its more ancient neighbour, St. Stephen. Maurice de Sully had hardly attained to the episcopal dignity when he determined to unite these two cathedrals into one, and laid the foundation of the existing edifice in 1163, Pope Alexander III. himself assisting; in 1182 it was sufficiently advanced that the High Altar was consecrated; but at the death of Maurice in 1196 the choir was not completed, as in his will he directs 5,000 livres towards the lead roof to be paid. The works actively progressed under his successor, Eudes de Sully, 1197 to 1208, and in the latter year the great west front was commenced, under Peter of Nemours, in 1218. The last remains of the old basilica of St. Stephen were removed to make way for the south transept. Under Philippe Auguste the west end was completed as far as the base of the gallery connecting the two towers, and the magnificent appearance of this front influenced the rebuilding of the two transept fronts, which before were of

a sterner and less elaborate description. An inscription on the south transept attests that the work was undertaken by Jean de Chelles, in honour of the mother of Christ, 1257. The north transept and first chapels and the Porte Boriga, abutting on the transepts, followed, and the upper part of the towers and the intermediate gallery were completed very shortly afterwards. The end of the thirteenth and commencement of the fourteenth centuries saw a great change in the original grand and simple plan of the cathedral. Jean de Paris, archdeacon of Soissons, left a large sum for the addition of the lateral chapels of the nave between the buttresses. Those around the ambulatory of the apse date from the commencement of the fourteenth; and many other considerable changes, both internally and externally, which totally altered the original severe style. The present appearance of this truly grand cathedral, in spite of the rude storms of seven centuries, and those other storms, even more destructive, of human passion and violence, and robbery and wrong, is marvelously majestic. The stern and simple grandeur of its west front, incomplete as it may be without its crowning spires (and long may it remain so), still dominates over the Paris of to-day, as it did over the Paris of the Middle Ages, lifting itself up like a rock, and defying, as it were, the surging waves of tumult and strife which have been successively dashed against its base. The Abbey Church of St. Germain des Prés, both in point of size and antiquity, ranks next in importance to the cathedral. Situated at the extreme south-west of the city, it was once outside the walls, but the frequent depredations of the Normans caused it to be inclosed and fortified and defended by a moat. Childebert, on his return from a victorious campaign against the Visigoths, was moved by St. Germain, bishop of Paris, to found this abbey, to preserve the relics which he had wrested from them, and amongst these was the tunic of St. Vincent, and the day on which he died St. Germain dedicated it to the Holy Cross and St. Vincent. St. Germain dying very soon after, such miracles took place at his tomb in the oratory of St. Symphonian, in the crypt of the great church, that he soon became more in fashion than St. Vincent, and the church was ever afterwards called by his name. Nothing remains of the splendid buildings of the first home of the Benedictines in Paris, once surrounding the church, with the exception of a pile rebuilt during the Renaissance for the abbot's lodgings, but the church remains in a very perfect state, although shorn of two of its spires. The plan is that of a large transeptal church with apse, ambulatory, and radiating chapels; towers in the very unusual position of flanking the choir in the angle formed by the transept, and a large western tower and spire. It served as a place of sepulture for all the kings and queens of the Merovingian dynasty until Dagobert founded and built the abbey of St. Denis, which became in after years the Westminster Abbey of France. The refectory, built by the same architect as the Sainte Chapelle, Pierre de Montereil, was looked upon as the most magnificent anywhere; it was vaulted, 115ft. long, 32ft. wide, and 47ft. 7in. to the vault. Close adjoining to this was the chapel of Our Lady, only rivalled by the Sainte Chapelle. Internally, the nave of the abbey church consists of five bays, then the transepts of only two bays in depth, a choir of four bays, and an apse with five bays and apsidal chapels of very small projection. Unfortunately for the architecture, it has been painted all over, utterly destroying all interest in it, although imparting another from the excellence of the painting by the late Hippolyte Flandrin. The date of the work in the nave is eleventh century, that of the choir slightly later, as the Pointed arch, in conjunction with the circular, first makes its appearance. Pope Alexander III. dedicated the church in 1163, and there is a certain similarity in the magnificently bold caps of the columns in the choir to those in the nave at Notre Dame. I am sorry to add that many of the caps of the nave are modern; the originals are in the Museum at the Hôtel Clugny, but as they have all been more or less gilded and painted, it is now very difficult to discover which are ancient and which are modern. Turned into a manufactory of saltpetre during the demerit period of the Revolution, it was pretty nearly utterly destroyed, and would have shared the fate of its superb abbey buildings. Many of the royal tombs which were first transported to

the Museum of the Little Augustines were afterwards removed to St. Denis. One or two points are worth special attention. The first is the very marked deviation of the choir from the axis of the nave; secondly, the very rare ancient marbles worked up in the columns of the triforium stage, evidently the remains of Childebert's basilica; and, lastly, it was in the prison of this abbey that those horrible massacres first commenced, giving rise to that significant term, *Septembriseurs*, applied by those demons of the Revolution to the horrible work of that month.

(To be continued.)

HOUSEHOLD SANITARY ARRANGEMENTS.—V.

PROFESSOR CORFIELD'S fifth Cantor lecture, delivered at the Society of Arts' last Monday evening, was principally devoted to the consideration of sewerage arrangements. Under the term "sewers" he included all pipes and conduits used for the conveyance of refuse by gravitation, whether laid in houses or streets. In some country places where dry systems of disposal are adopted, the waste liquids are got rid of by passing them into agricultural drains, and these being porous and loosely jointed, too often allow the fluids to escape at the first few joints, while the fatty matters cling to the leaks, and gradually choke the pipe. Some mode of flushing is, therefore, essential, and to meet this want Mr. Rogers Field has devised a self-acting flushing tank, the action of which was illustrated by diagrams, working model in glass, and a specimen. It is an earthenware tank, having at the opening in top by which the water is received a loose iron grating, which again fits into a siphon-shaped bend of tubing. There is also an overflow-pipe, but this, of course, only removes the water above its outlet level as received. The peculiarity of this tank is that it also contains at one end a large siphon, which starting a little above the bottom passes through the side near the top of tank, this long leg ending at a lower level above a small weir, communicating by channel with drain. By an experiment performed with a large glass model lighted from behind, it was shown that the tank can be filled to its utmost capacity, when the slightest addition to the contents seals the siphon by the aid of the water in the weir, and the tank is quickly emptied to the level of the short leg of the siphon. The sediment is retained in the tank, and can be removed by other means, while the sudden discharge of water is sufficient to flush a drain. Proceeding to his chief subject, the lecturer remarked that in towns the main sewers in streets are usually built of brickwork and egg-shaped in cross section, that form affording the best scour and least friction, and being easy to construct. House sewers are often of stoneware, and these are circular in section. Speaking generally, all sewers below 18in. diameter ought to be of glazed stoneware; above that size the greater cheapness of bricks and the ease of construction made brickwork the most practicable material. In these cases the bricks should be of the very hardest kind, and should be set in cement. It is a good plan to use invert blocks of stoneware for brick sewers. Some made by Messrs. Stiff and Sons were exhibited, a noticeable variety being that in which a gridded rest is placed beneath the sewer, impervious vertically so as to prevent leakage, but pierced longitudinally to facilitate subsoil drainage. Stoneware mains would be used to a much greater extent in small streets and towns were it not for the mistake so often made in estimating the size required; sewers are almost invariably too large, a survival of the old practice of planning them capacious enough for a man to enter and cleanse them. That cleansing can be effected by flushing, provided the sewer be nearly or quite filled with water, under high pressure, and the flow is sudden; management is more requisite than mere quantity of water. Given sufficient size in a sewer, all beyond is an absolute disadvantage, as the sewage flows in a shallower stream, more foul air is allowed to accumulate, it is more difficult to flush it, and it is increasingly expensive in construction. In laying sewers provision should always be made for making new connections without cutting into pipes; junctions should be laid in a line with the flow of streams, as otherwise the larger channel becomes blocked with sediment at the intersection. Pipe sewers are usually jointed

together by sockets luted with cement. Where there is no risk of settlement this is the best arrangement, as it allows no leakage, and the stiff joint necessitates keeping the line of sewer straight. Where there is a probability of settlement or pressure the makeshift plan is adopted of luting the joint with clay and adding an external ring of cement. Simple clay joints are a mistake; frequently, as the lecturer had had frequent opportunities of seeing in London houses, the clay is washed out by the percolation of fluid, and the sewer becomes blocked up by sediment collected around the leak. Another kind of joint is Stanford's patent, in which the one tube fits into the other by a conical end covered with some elastic composition, which is greased before insertion. Where the pipes are straight this makes a water-tight joint, but great care must be taken during laying to insure that no chipped caps are passed. In private property subsequent connections may be provided for with the ordinary socket-pipes by inserting junctions at points that will suggest themselves. With street mains more ample provision should be made, both for connections and inspections. This can be done by using Jennings' spigots, which, by a series of loose half-pockets on the upper side, allow of the sewer (which has no sockets) being opened at any point without cutting the pipes. With ordinary socket pipes, Doulton & Co.'s operculum or lidded pipes may be used with advantage, in these about 1-3rd of the upper part of pipe is so nearly loose that it can be easily detached by a tap from a chisel. Yet another contrivance for obtaining ready access to sewers without having to cut into them, is the "capped" arrangement; in this method half-a-circle is cut out of each pipe as it is made, so that when two pipes come together a round hole is left at the top. After the sewers have been laid and examined these holes are closed by means of lids made for the purpose, which may be removed at any time for new connections to be made. These pipes are made by Jones and Co., of Bournemouth. Main sewers require ventilation, and this is most perfectly secured by openings at the street level. If such ventilators are a nuisance, it is evident that foul air accumulates in the sewer which but for this would pass into the houses; the remedy is not to stop up the ventilator, but to make another or two to allow of freer passage of fresh air. The ventilation of sewers is never perfect till it is constant, and sufficient to prevent all objectionable smells, and all complicated plans for effecting this have proved miserable failures. More than 30 years since it was proposed to connect all sewers with furnaces so as to draw out and consume the foul vapours. The scheme was tried at Battersea, and acted with a vengeance at times, the air being occasionally drawn through the houses, breaking the water seals of the traps, while at intervals the operation was too sluggish to have any good effect. One day some coal gas leaked from the gas to the sewer mains, and the works at Battersea were wrecked. Yet the same idea has been put forward within the past four years as a novel and practicable idea, notwithstanding the literal explosion of the theory in 1844. The ventilation of house sewers should be effected as far as possible from the dwelling. Where it must be near the house the ventilating pipe should be carried well above the ridge of the roof, so that whatever quarter the wind blows from the foul air must be driven away from the house. Private sewers should never be of brick, for not only is there great danger of leakage both of fluids and gaseous contents, but they can be eaten through by rats, who to their ravages in the larder add the danger of bringing sewage matter on their coats and feet, while their run form convenient exits for sewer-gas. It is preferable to keep all sewers to the backs of the houses, where the sculleries and offices are situated; but as our main sewers are generally laid through the front streets, it is in most old towns unavoidable that the house sewers shall pass under the premises from back to front. They ought, therefore, to be of glazed stoneware, and to have a fall of at least 1 in 48. In all but large mansions 6in. was ample diameter for house sewers, with 4in. branches. Connection with the main sewer is usually made through a galvanised iron flap, hung so as to remain closed except when sewage passes. This flap does not keep sewer air out, and only prevents the entrance of rats when it is not propped open by a slight obstruction. In addition to this, some form of water trap should be used to check the entry of gas. Formerly, a dipstone was used for this purpose; a rectangular piece

was made beneath the sewer, and into this a stone hung vertically, so as to maintain a constant depth of water. It was, in fact, a mitigated cesspool; deposits were retained especially in the corners, and the nuisance was greater than if no trap had been used. An improvement was to slant the depending stone to an angle corresponding with the flow of sewage, and to obliterate the angles of the recess, and a further development made the fall sudden on the inward side and gradual at the exit. Every trap is in reality a cesspool, and the aim should be to obstruct the flow as little as possible, while securing such a bend filled with water as to check the upward passage of gas. If our main sewers were properly ventilated, he doubted if any kind of trap would be of use, but until public opinion is sufficiently advanced, their imperfect protection must be availed of. The simplest form is that of a shallow siphon, of which several varieties were shown, stoneware being recommended as the best material. Even these get stopped up occasionally, and a vertical pipe should therefore be taken from the top of trap to ground level to allow of flushing and inspection. Following upon these improvements, it was found advisable to permit air under certain precautions to have access to the private sewer, if between the water-trap and the house. Whether the gas is generated in the private or main sewer it is an advantage that it should escape into open air rather than into house, and if air passed inwards this was also a benefit. This air connection can be obtained in several ways. In Weaver's trap a pipe is built up from the trap to the front area of house, and is here covered by open grating. Buchanan's arrangement resembles this, only the fall of house sewer is more vertical. In Potts's Edinburgh chambered trap, there is a large open channel, communicating with external air by long inlet. This method is exceedingly useful where sewers are being laid for first time, but the length of fall required is considerable. Professor Fleming Jenkin advocates the use of two siphons, one behind the other, so that if the water seal of the first should be destroyed, the second will remain intact, but Dr. Corfield regarded this as a needless complication. If two were better than one, why not employ three, or, indeed, a whole series of siphons. A rather more expensive disconnection than those mentioned, is one recently introduced; it consists of a man-hole placed over a chamber, with an open channel in the section of sewers running beneath it. The man-hole is entered by a locked galvanised-iron door with open gratings, and a pipe passes from the chamber to roof of house, with gratings at intervals. Dr. Corfield expressed his belief that in the end this would be found the best plan for disconnection, ventilation, and inspection. He had never known a single instance in which this system of manhole and pipe disconnection and ventilation had proved a nuisance, and under no circumstances could foul air accumulate in such a house sewer. In any method of ventilation it is desirable that the outlet should be above the roof-level rather than in the area. Cows may, by some, be thought ornaments, but for practical purposes are better omitted, and a couple of wires or a grating placed over the head of pipes. One accidental advantage of cowl is, that if they are added, people suffer a pipe to be carried higher than otherwise. It was necessary that there should be a connection with sewer from lowest part of basement, to provide for the removal of water used for cleansing the floors, and against accidents, such as floodings from burst water-pipes or boilers. This receptacle and its pipe should be well ventilated, and only discharged into sewer after passing through an open space, even if the channel were at the bottom of a grated shaft sunk in the area. The entire disconnection of this basement drain was of great importance. Dr. Corfield announced that, in his closing lecture, to be delivered next Monday, he should treat of water-closets, sinks, and baths, and the arrangement of their pipes and traps.

RAILROADS AND STEEP INCLINES.

IN a paper on "Experiences of Early Engineering Operations on Railroads," read by Mr. W. Milner Roberts, C.E., before the American Society, and reported in the last number of their *Transactions*, the author recounts his experience of steep inclines in connection with the Pennsylvania railroads. Railway enterprise

had just commenced in England, and Mr. Roberts was employed as a young assistant of Mr. Canvass White, then a leading engineer. The first American coal and passenger railroad was that from the summit of the Broad Top Mountain; the inclined plane had an elevation of about 200ft., its length being about three or four times its height. It had a double track passing-place at the middle, but single at the ends, and was worked by gravity. The loaded car in descending turned a large drum at the head of the plane around which the rope was wound which pulled up the empty car. Another plane, on an improved principle worked by water-power, was constructed by Mr. White in 1827. The motive power, we understand, was by a water-wheel geared into movable bars or racks along the entire length of inclined plane. The writer details his experience in the construction of several planes on the western and eastern slopes of the Allegheny Mountain. These planes varied from 8 to 10½ per cent.; the longest being 3,116ft., including a short curve at the top, and a curve 200ft. long at the bottom; its rise was 308ft., the straight part an inclination of 10½ ft. per 100 or an angle of 5° 51'. The plan of working adopted was a double track, and an endless rope worked by a stationary engine at the head. We may also mention that in 1824 a canal through the Allegheny Mountain and a tunnel 4 miles in length was proposed—the last was ridiculed; but canals were looked upon with more favour at that time, and most of them were begun in 1826. The author says a railroad over the mountain was authorised in 1829, with inclined planes between the terminal points of the canals—Hollidaysburg on the eastern and Johnstown on the western side. Eleven inclined planes were proposed, and ultimately five on each side were adopted, all straight; the maximum inclination was 10½ ft. in 100ft. There was an impression at this time that locomotives could do very little work on grades above 30ft. per mile, and this gradient was the maximum adopted by Major Wilson, who planned the first State railroad between Philadelphia and Columbia, and this necessitated two inclined planes called the "Schuylkill" and the Columbia, the former being over a mile in length with a rise of 187ft. In 1847 the Legislature appointed the author to survey and report upon a route avoiding the Schuylkill Incline. The Allegheny Portage Railway was opened in 1834. Any persons could put cars on the track and haul them with their own horses from either end to the foot of the first plane and on the intermediate level; the State only transporting the cars up and down the inclines by means of engines. Into the details of the machinery for working the planes, we refer to the author's paper; suffice to say, there was an endless rope 3½ in. diameter passing round a horizontal double-grooved wheel at the head of plane and thence supported on numerous sheaves, set in the middle of the tracks to the foot and around a movable grooved wheel below foot of plane. The writer records incidentally the boring of a well 800ft. deep from the head of one of the planes, which turned out absolutely dry, the rock bored being compact slate. Subsequently the inclined planes of the Allegheny Portage Railroad were abandoned for a graded railroad. The author says, "few travellers who view the beautiful scenery of this part of the Allegheny Mountains are aware that there are two important railroads, the Pennsylvania and the New State Railroad, now dead almost in sight at the summit of the mountain." This graded road had gradients of 75ft. per mile and 52ft. per mile. The writer next describes the construction of the Dom Pedro Segunda Railway, Brazil, across the "Sierra" back of Rio Janeiro, a very difficult work, as the summit of the mountain to be surmounted was about 500ft. above the grade of railway at the eastern end of the *Tunnel Grande*. The length of the track, which was temporary, was 5 miles, the maximum grades being 238ft. per mile, with curves of only 230ft. radii. At this time the people declared they would "never ride under the Sierra through the Big Tunnel," and they long preferred the more perilous journey round the summit, the speed of the trains being limited to 5 or 6 miles an hour. The tunnel was pierced through granite which, singular to say, was not compact in the centre, but was found very wet, and of partly decomposed granite subject to heavy caving and requiring stone arches and walls. The paper of Mr. Roberts is interesting as showing the early methods of traction along steep gradients, while experience has given proof that

the ordinary frictional adhesion of locomotives is ample for almost every practicable degree of acclivity.

BRICK ARCHES FOR LARGE SEWERS.

IN a paper by Mr. R. Hering, C.E., read before the American Society of Civil Engineers, some useful observations are made upon the conditions of stability of arches with long axes. In the city of Philadelphia several miles of large brick sewers are constructed as large as 20ft. diameter, and some of these have failed by total collapse or by flattening at the crown and spreading at the springing. Circular rings of a thickness determined by formula appear to have been employed, the spandrels being filled with rubble, and having abutments. The author first describes the failure of a large sewer—the Mill Creek—20ft. diameter at the spring, built of two concentric rings of brick with rubble masonry abutments, battered outwards at the sides, and straight below the invert which is segmental. The section resembles that of a tunnel of ordinary construction. The mortar is described as poor and scanty, and the drawing given illustrates the line of pressure graphically worked out. This line is not confined to the middle third of the joint area, but is shown to intersect the joints of rupture at the crown and haunches of the original sectional form at 1-10th of the thickness of section, locating the neutral axis at 3-10ths, which leaves 7-10ths of section under tensile strain, and 3-10ths under compression. The effect of this as well known is because the joints at crown in the intrados, and those of the haunches in the extrados, to open, as the neutral axis in this instance passes within the section. The sewer was found to have been crippled accordingly. In short, the author shows, by calculation, that the strain in the arch amounted to 429lb., whereas, according to Trautwine, cracking and splitting of brickwork occurs at about 400lb. All the effects of chipping at the joints expected were found to have occurred in this case, thus proving that the theory and actual failure agreed. The arch was found to have changed its form by sinking at the crown throughout its length. Another example is illustrated a sewer with an elliptical arch, 18ft. 6in. in diameter, varying from 18in. thickness at crown to 3ft. at springing, having changed its form in a similar manner, though the materials were good. The author next shows a section of a differently designed sewer arch, based on the method of graphical statics, in which the following points were observed:—1. "That at no point should the material be subjected to more than a safe fraction of its ultimate crushing strain." The author assumes the safe resistance of brickwork at 80lb. per square inch, and proposes a convenient formula, as follows:—

$$\text{Least thickness of arch in ins.} = \left\{ \begin{array}{l} \text{Pressure at joint of rupture} \\ \text{in lbs. per foot lineal} \\ 480 \end{array} \right.$$

2. The bed joints of the bricks should be as nearly as possible at right angles to the direction of the line of support. 3. The line of pressure must be situated in the kernel or middle third of the arch to prevent any tendency of rotating. It must also intersect foundation at a point sufficiently far from edge to be safely resisted. Another point, we may mention, is that the brickwork is to be bonded so that the line of pressure will pass through the middle of the headers as much as possible to prevent separation of the rings. A section of a sewer is shown, the result of attention to these points. The arch is struck from 3 centres, the crown at 8ft. radius and the lower arcs of sides at 17ft. 8in. radius; the arch is thickened as it descends to the rubble abutment, and the stones of the latter are placed so that the line of pressure cuts them at right angles to their bed joints. We are informed the arch has stood well for two years, and there is no sign of cracking, change of form, or chipping of bricks. Mr. Hering's arch is certainly based on common-sense principles, and the wonder to us is how the other form could ever have been applied to so large a sewer.

The following building grants were made at the last meeting of the Gloucester and Bristol Diocesan Association:—Churches: Elmora, £100; St. George's, Gloucestershire, £150; Moreton Valence, £50; St. James, Gloucester, £150; Taynton (Mission room), £30; Sutton-under-Brilles (additional), £50.—Schools: St. Luke's, Barton-hill, £50.—Glebehouses: Chedworth, £50; Coaley, £50.

MOVABLE BRIDGES.

At the meeting of the Institution of Civil Engineers, on Tuesday, the paper read was on "Movable Bridges," by Mr. James Price, M. Inst. C.E.

The term "movable" was used as being more general in its application than any other. Such bridges mostly occurred where delay of traffic was to be avoided. Hence rapidity of movement and minimum of repairs should be sought. There should be no unnecessary weight; for this reason steel was preferred to iron as a material, saving 25 per cent. of the weight of the parts strained. Movable bridges were divided thus:—1st, bascules; 2nd, swings; 3rd, traversing; 4th, lifts; 5th, pontoons.

1st. Bascules were illustrated by the railway bridge over the Ouse at Selby, erected in 1839. The largest of this kind had been opened at Copenhagen in 1867. Overhead beam bascules were much used in Holland, the beams being usually of timber. The author had erected a large single flap bascule over the Shannon, to carry a railway; the floor was open to let the wind through when the flap was raised; it acted well. 2nd. Swing bridges formed the most important class, and all large structures in Europe and in America belonged to this type. Double passages were preferred, as obviating heavy counterpoise and wind stress; instances of both occurred in the South Bridge, Hull. Swing bridges were classified thus:—Those that turned on rollers only; those that turned on rollers and a centre pivot; those swung entirely on centre pivots; those lifted on a water centre and tilted; those relieved by hydraulic pressure acting upwards at the centre; and floating swings. Unlimited hydraulic power available for turning was not conducive to obtaining light and well designed structures. The earliest swing bridges were of timber; then cast iron was employed, and now they were universally of wrought iron. The Brest Bridge, having two leaves, spans the largest passage crossed by any movable bridge; it turned on rollers. To the same class belonged also the railway bridge over the river Ouse at Goole, which was almost the largest railway movable bridge; it crossed two passages of 100-feet span each. There were several bridges of this kind at Birkenhead. The Duke Street bridge rested on rollers 5 feet in diameter; it was not balanced over the centre, and was difficult to open. Athlone Bridge, over the Shannon, had rollers only 8 inches in diameter; it worked badly. The great majority of swings turned on rollers and a centre pivot, including all the large American bridges; the most notable was the Raritan Bridge, a double swing, with two passages of 216 feet in width each. This bridge, which had been erected by the Keystone Bridge Company of Philadelphia, was peculiar for being lifted entirely off its abutment supports, thus needing no wedging up. To this class belonged also the tilting bridges generally adopted in France, at Dunkerque, Gravelines, Havre, Cette, and Tonlon. The same type had likewise been adopted in North Germany. The principle might be described thus:—The whole bridge being slightly out of balance, each leaf or the heavy end was set up by various methods; and when the abutment support was withdrawn, it dropped on two or more wheels, the main weight, however, being carried by the centre pivot. A bridge of peculiar construction had been erected at Grimsby to carry the Manchester, Sheffield, and Lincolnshire Railway; it had no tail-end or counterpoise; it was anchored at the pivot, and bore with a pressure of 122 tons on a pair of wheels near the edge of the passage. The Dutch type belonged to those turned entirely on centre pivots. They were to be seen at Rotterdam and Velsen, on the North Sea Canal. The girders were under the roadway; and the point of support was brought above the centre of gravity by means of a long cone passing up between the girders. In those lifted on a water centre and tilted, the leaves were slightly out of balance. When the centre was raised by hydraulic pressure, the bridge tilted so as to bear on wheels. In some cases, as at Leith and at the Albert Dock, Hull, the tail-end was heavier, and dropped with its wheels on to a tramplate. Or, as at Marseilles, Millwall, Stobeross (Glasgow), &c., the tail end was lighter, and rose in tilting till its wheels bore against the underside of an inverted tramplate fixed round its sweep. The dimensions and arrangements of the Leith and Marseilles bridges, which were

constructed in the same year (1874), were compared. Swing bridges, relieved at the centre by hydraulic pressure, were represented by the Tyne Bridge, which was the largest and most perfect in this country, having two passages of 110 feet each. Floating swings, as constructed by the author in Dublin, were used, one to carry a double carriage road, and the other a single line of railway; the latter acting also as a turntable for waggons, so as to shoot them across the dock entrance. The principle was to support nearly all the weight on a submerged buoy, which turned on a centre pivot on the bottom. These bridges were effective, and suitable for places where the foundation was bad. Traversing bridges required much power. The larger ones were represented by the bridge at Swansea, over the River Tawe, in which the heavy end was across the passage. In swing bridges that turned on rollers, by withdrawing the supports from the long end, the tail end rose till the wheels came level with an upper traversing rail, upon which the bridge was rolled back. In the case of the Millwall Dock, the centre was raised by hydraulic power, and the light end, which crossed the passage, was held down by horns, that prevented it rising; hence the heavy end rose to the proper level to be rolled back. There were many other forms of traversing bridges, the best for a railway and manual power being at the Dovey Viaduct. Mr. Kinnip's submerged caisson was also a traversing bridge, the wheels taking the portion of weight not buoyed up, running on rails laid in the bottom; it bore the same relation to other traversing bridges as floating swings did to other types. The balancing of both swing and traversing bridges should be as nearly as possible over the centre, otherwise, particularly in the former, motion was difficult. The proportional lengths of tail ends of swings varied. In the Marseilles Bridge the tail was to the passage arm as 0.62 to 1; in the Brest Bridge, as 0.50 to 1; and, in the South Bridge, Hull, as 0.40 to 1. These represented extreme and mean cases. If possible, the counterpoise should form some useful part of the bridge, such as cross girders and flooring combined, in the form of a solid cast-iron floor. The modes of setting up the ends were various, consisting of wedges, inclined planes, toggles, weigh shafts, eccentrics, hydraulic lifts, screws, &c. The Phoenixville Bridge Company had a self-adjusting joint of the rails, something similar being used at Keadby Bridge. At Marseilles, there was a bridge which was a combined bascule and swing. The first motion of the centre ran lifted it off the bearings only for being swung; but it could be further lifted till a part of the bridge turned round a horizontal axis; and it allowed barges to pass without being swung, thus saving much time. Lift bridges, which rose bodily, and allowed a passage for canal-boats, were not common. One had been erected over the Surrey Canal, and another by the author, which worked well and easily. The author had charge for many years of an ingenious pontoon bridge, erected by Mr. Robert Mallet, M. Inst. C.E., which worked most satisfactorily; it was now done away with, a portion of the canal which it crossed having been filled.

COMPETITIONS.

NEWTON ABBOTT.—For plans for the erection of a coffee-tavern in Market-street, Newton Abbott, the directors of a limited company recently offered premiums of £20 for the best, and £5 for that placed second. Some twenty designs were sent in and the directors have selected those by Mr. Jones, architect, of London. It seems doubtful whether the scheme will be carried out, as some of the shareholders incline to purchasing and altering an old house instead of building.

PENDLETON.—A competition has been arranged for the rebuilding of Brunswick Wesleyan Chapel, Pendleton, the cost of which must not exceed £8,500. Designs have been sent in, under mottoes, by four architects invited to compete, and they are now on view in the present chapel. The trustees have not yet selected any design.

SPALDING.—About sixty designs were sent in for the new Johnson Hospital, proposed to be erected in Spring-gardens, near St. Peter's Church. Of these twenty-five have been marked by the trustees as selected for further consideration, these being by architects in London, Leeds, Leicester, East. Dereham, Warwick, Peterborough, Stamford, and Derby.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

ANCIENT GRAVES IN ROSS-SHIRE.—At a meeting of the Society of Antiquaries of Scotland held in Edinburgh on Tuesday week, Mr. Jolly read a paper describing the ancient graves recently discovered at Dahmore, in Ross-shire. The first group of ten graves was found above Dahmore distillery. They consisted of cists formed of flat stones of different sizes resting on the ground and covered on the top with one or more flat stones of larger size. This group appeared to have been enclosed within a stone wall, the base of which could be traced on three sides covering a space of 108ft. by 66ft., the shorter walls running north and south. In the most westerly grave of the group—which was about 2ft. 6in. by 1ft. 8in. and 1ft. broad—there was a skeleton in the contracted position, finely worked flint-knife, a necklace of 50 beads of shale, and a "bracer" a stone implement supposed to have been used to protect the left wrist from the recoil of the bowstring. The other graves all contained burnt bones, accompanied in some cases by urns, one of which was of very unusual type. The bones were mostly human, but in some cases mixed with those of animals. In one grave a fragment of a small oval bronze blade with a tang was found. The second group of graves was about 200yds. from the former. The graves were eight in number; of these two contained burnt bones, three had remains of unburnt bodies accompanied by urns, and in the other three no remains were discovered. The paper was illustrated by plans and drawings by Mr. Alexander Ross, architect, F.S.A. Scot., and Mr. Maclean, of Easter Ross.

SCHOOLS OF ART.

NATIONAL ART TRAINING SCHOOL.—The medals and other prizes won by students of the South Kensington Schools in the local and national competition of 1878 were distributed on Monday, Mr. Poynter, R.A., Director of the Art School, said that the prize-winners were students of the two schools at South Kensington—one for male and one for female students—the schools being in competition with each other, and with all those of the United Kingdom. Explaining that the competition among the students in training and national scholars was, on account of the exceptional advantages they enjoyed, separate from that of the general students, he enumerated the higher distinctions—one silver medal, two bronze medals, and 13 Queen's prizes of books—won in the national competition, besides 66 prizes of books won in the local prize section—in all, 82 prizes. The students in training and national scholars competing for honorary distinctions obtained 3 gold medals, 11 silver medals, 21 bronze medals, and 20 Queen's prizes of books. In the competition for prizes open to all students in the National Art Training School the awards included 10 silver medals and 21 Queen's prizes of books—a grand total of 171 prizes. The number of individual students attending the schools during the year had been 849, of whom 384 were male and 465 female students. In the 3rd grade or highest examination 29 of their students had obtained the teachers' certificate. The fees paid amounted to £3,832, of which sum £316 came from evening students and the balance from the day students. Mr. G. Morton had gained the gold medal for a life study. The students had not gained the gold medal for studies of the antique, and they had been beaten by the Edinburgh School, and also by the Bloomsbury School of Art—a school composed entirely of ladies. The general standard in the South Kensington Schools was, however, now considerably above that of three or four years ago. In the modelling class they had carried off all the prizes worth anything.

SOUTH LONDON.—The prizes awarded by the Science and Art Department to the students of the Southwark, Nine Elms, Greenwich, Woolwich, and Stepney Science Classes were distributed at St. Olave's Grammar School, Southwark, on Friday week, by Professor J. E. Thorold Rogers, who delivered an earnest address to the students, impressing upon them the value of self-culture. In closing the proceedings, Mr. Parton Parry, under whose direction the classes were held, said it was an undoubted fact that the Continental workman was beating the Englishman out of the market. He deplored the want in this country of a cheap and simple system of patent laws.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

SHIPTON BELLINGER CHURCH, HANTS.

At the end of the last century the fabric of this church having become dilapidated, it was treated in a very ruthless manner; the walls of the nave were lowered about 3ft., cutting off one-half of the tracery of the windows and the rood screen and many ancient features destroyed. Thus it was left until last year, when the chancel being in danger of falling, the then vicar, the Rev. W. C. Baker, inaugurated a movement for its repair and renovation. Sir John Kelt, Bart., the patron of the living, and others having provided the necessary funds, the work of restoration is now being carried on under the direction of Mr. Withers. The chancel is almost wholly rebuilt, the nave walls raised to their original height, the windows and stone rood-screen restored from fragments found in the walls, and the whole building newly roofed and refitted. Three fine old bells remain, and will be rehung. Painted glass by Mr. Daniel Bell fill the east and west windows, being gifts of two former vicars respectively. The church is dedicated to St. Peter, and the annual village feast is still held on the 12th July, the morrow of St. Peter, old style. The cost of the work will be about £1,400, and the builder is Mr. Sturgess, of West Cholderton.

WATLINGTON CHURCH, NORFOLK.

This fine fourteenth-century church lies midway between Lynn and Downham, and among so many dilapidated buildings it stands almost unique in fine preservation. Less than usual has been done to the fabric in the shape of alteration. The ancient sacristy, easily traceable, is gone, and its place filled by a mortuary; the aisle roofs are modern of the worst type; the porch has been badly rebuilt, and, with the exception of a few ancient seats, font, pulpit, &c., the interior fittings are modern. The chancel roof is original, whilst the nave, roof, and clerestory date from the sixteenth century. The beautiful and varied tracery and proportions of the windows, piers, and arches, and their excellent preservation are worthy of note, being constructed of Barnack and Clipsham stone. In its repair and refitting, under the direction of Mr. Withers, great care will be taken not to destroy a single ancient feature of the church, or to do more than is necessary to preserve the fabric, or to restate work wantonly destroyed. The church contains five bells, and is dedicated to St. Peter and St. Paul.

RESIDENCE AT HAMPSHEAD.

We give this week perspective views and plans of the residence and stables recently erected for H. Gainsford Gotto, Esq., near the top of Child's Hill, Hampstead. The buildings are faced with Malm bricks, relieved with bands of bricks of a dark brown colour. The stonework is Portland, and the roofs are covered with Staffordshire tiles. Half-timbered work is introduced in the upper part of the tower, and in the gables and dormers of house and stables. The greater part of the house is carried up three stories high, a billiard-room 27ft. by 18ft. being formed on the top-floor over the dining-room. The stables are built at the entrance to the property, and are so arranged that the rooms on the first-floor shall accommodate the gate-keeper. An outside staircase is provided for access to these rooms. The cost of the buildings when finished will be about £4,200. The work has been carried out by Mr. Stanley G. Bird, from the designs of Messrs. George Lansdown and Harries, of 2 and 3, Warwick-street, Charing-cross.

PREMISES AT CORNER OF NEW BOND-STREET AND CONDUIT-STREET, W.

This important addition to the street architecture of London, from the designs of Mr. John Thos. Wimperis, of Sackville-street, Piccadilly, has just been completed by Mr. Wm. Brass, of Old-street, City. The position of ancient lights of the adjoining buildings caused a great deal of delay and trouble, and necessitated a flat roof being used. By the introduction of angle turrets, and chimneys with the parapet broken up by pediments, a varied skyline has been obtained; the angle turret especially being very picturesque, and is, without doubt, a most striking feature from whichever way it is viewed, and particularly when going down Bond-street. The upper story of this turret, as will be seen by our illustration, is formed into a loggia. The carving throughout is of a very effective character, the whole being a treatment of conventional foliage, typical of the business to be carried on, which is that of Messrs. Cadbury and Pratt, cheese and butter merchants. Ornamental iron balconies have been introduced, and add to the effect. The materials used generally throughout, are Portland stone and red bricks, with red Mansfield subbase, and Forest of Dean plinths to the pilasters of shopfront. Great attention has been paid to thoroughly ventilating the shop and basement, owing to the peculiar character of the business, and the shop has been fitted with wainscot counters and office fittings of good character. The walls and other portions are executed in coloured marbles, with a pitch paralled ceiling of good design.

ROYAL ACADEMY SILVER MEDAL DRAWINGS.—DETAILS OF SOMERSET HOUSE.

In the BUILDING NEWS for January 3rd last we published the general drawings of this interesting gateway, of which Sir William Chambers was the architect, by Mr. R. W. Gibson, for which he was awarded the Royal Academy silver medal last year. To-day we publish some of the enlarged details: by these the elegance and beauty of the design may be clearly seen and studied. Such drawings as these will always be of value, and we are glad to present them to our readers. We hope shortly to give a drawing in detail, also by Mr. Gibson, of the York Stairs at the bottom of Buckingham-street; a work so neglected that its present condition is a disgrace to our Board of Works.

The foundation-stone of a new Wesleyan chapel was laid at Perranwell, West Cornwall, on Monday. The edifice will be Early English in style, and will be constructed of local stone, with granite dressings near the base, and Bath stone in the upper portions. Beneath the chapel, which will measure 70ft. by 42ft., will be a schoolroom and vestries, and at the back of the rostrum will be a minister's vestry, choir-room, and heating chamber. The chapel will be surrounded by galleries approached from the lobby by stone steps. Mr. James Hicks, of Redruth, is the architect, and Mr. J. Blight, of the same town, the builder. The contract has been taken at £1,700.

New Wesleyan school buildings have been opened at Swinton, near Manchester. They have been built from the designs of Mr. S. Rawlinson, of Swinton, are faced with brick and stone dressings, and fitted up in pitch pine. Accommodation has been provided for 600 scholars, at a cost of about £2,200.

PARLIAMENTARY NOTES.

THE DEATH-RATE OF THE METROPOLIS.—Sir U. Kay-Shuttleworth, on Tuesday, asked the President of the Local Government Board whether it was true that the Registrar-General had reported that the death-rate of the Metropolis, which was 22.3 in every thousand in 1876, and 21.9 in 1877, had risen in 1878 to 23.5 in every thousand; whether this increase was almost entirely due to zymotic diseases; whether the death-rate had risen to a still higher figure in recent weeks (29.2 in that ending March 8th); whether Dr. Frankland had reported that during the past year the quality of water delivered by the companies who derived their supply from the Thames was inferior even to the unsatisfactory water-supply of recent years; and whether the Local Government Board had taken any action in consequence of these reports. Mr. Selater-Booth said, in reply, that the death-rate of London was 23.8, 22.3, and 21.9 per thousand in the years 1875, 1876, and 1877 respectively, and it rose to 23.5 in 1878. During the first ten weeks of this year the death-rate had been 26.3 per thousand. The average annual death-rate in London, taking the last eight years, was 22.8, against 22.6 and 24.3 in the two preceding decades of 1861-70 and 1851-60 respectively. About one-third of the increased death-rate in 1878, as compared with the exceptionally low rate in 1877, was due to zymotic diseases, and those were principally whooping-cough and diarrhoea. The annual zymotic death-rate in London from 1871 to 1878 had averaged 4 per thousand, against 4.5 and 4.9 in the two preceding decades. In reference to the next question, Dr. Frankland had reported that, with the exception of 1872, Thames water last year was more polluted than during recent years, but that was owing to the excessive floods rendering filtration exceedingly difficult. The monthly analysis of 1878 showed that out of 60 samples of water from the five Thames companies 40 were clear and transparent, whereas in the six preceding years of the average samples taken 42 were clear. The Local Government Board had no power to enforce the supply of water from fresh sources, but they had not failed to impress upon the companies the necessity of adopting all available improvements, and during the last two years the five Thames companies had expended upwards of £400,000 in constructing improved reservoirs, and these works were now either completed or in an advanced state.

THE LOCKS SUPPLIED TO THE WAR OFFICE.—Mr. Macdonald on Tuesday asked the Secretary for War if his attention had been directed to a correspondence in respect to a contract for locks furnished to the War Office, in which it was stated that a person furnished locks at a very large per centage above purchase price; whether he (the Secretary for War) had taken any steps to find if these allegations were correct, whether there was any particular reason why that tradesman was selected to supply locks, and whether it was correct that cast-iron locks were not used in the department till the contract was in the hands of the contractor in question?—Colonel Loyd Lindsay: Perhaps I may be allowed to answer that question in the absence of right hon. friend? Attention has been directed to the matter referred to, and for the information of the hon. gentlemen opposite I am prepared to state that the Secretary for War has had his attention called to the purchase of those locks, and the result has been to show that the locks were purchased from Mr. Hill at a printed price, not in excess of the ordinary retail price at which they are sold. The reason Mr. Hill was selected was because the locks he sold were considered well adapted for the purpose required. As to their being made of cast-iron, it has not been the practice to purchase locks made of cast-iron; but English manufacturers admit that if cast-iron locks were of good quality there was no objection to their being of that material.

On Saturday an official visit of inspection was paid to the harbour works of Newhaven by the directors of the recently-established company. The plans include immense sea-walls, to form a break-water and harbour of refuge, so as to inclose an area of 39 acres around the mouth of the river. The works are being carried out under the superintendence of Mr. F. D. Banister, who explained the plans.

The Town Council of Bristol have under consideration the purchase, on behalf of the city, of the Avonmouth Docks.

THE "BUILDING NEWS" DESIGNING CLUB.

A COTTAGE HOSPITAL.

AS might have been expected, some members who have felt themselves competent enough to contribute designs for houses and cottages, have not entered the lists for the above subject—whether from inability or from lack of boldness we do not know. The truth is everybody fancies himself capable of planning a house, and the result is an overwhelming number of designs—good, bad, and indifferent. In the present instance a cottage hospital for five of each sex, with convalescent ward, rooms for surgeon and matron, and other necessities was required, and in response we have several designs, the bulk of which indicate considerable care in the drawings, but, as might be imagined, a want of the knowledge of sanitary detail requisite for the task. If our club is to be of value in the instruction of students entering the profession, it appears to us that the planning of such buildings is of far greater use than that of a more everyday kind, and for which large facilities exist. In glancing over the designs, it is not a little singular or un-instructive to remark that many of the best plans we have received are from those members of our club who have shown the least aptitude in the previous competitions, and especially in the artistic work. It is the more desirable we should call attention to this fact, inasmuch as it shows that those with an artistic bent are often the least capable of any unusual labour or thought, as if the pleasure of their natural power ceased directly they applied themselves to labour they thought uncongenial to them. This we need hardly observe is the greatest error, and the reason why so many artistic members of the profession do not succeed in important public competitions. The greatest art in our opinion is that which can lend grace to the most prosaic work, the least—that which follows in the conventional groove. Hoping our little digression will be pardoned, we at once proceed to the designs before us, and here we have a confessedly difficult task to select a really suitable plan. The greatest weakness in those we have received is a want of simple arrangement and classification. The principal point seems to be a cottage-like, and, if possible, an informal kind of plan, in which the wards partake more of rooms, and the administrative offices resemble those of an ordinary dwelling-house. But, of course, this idea must not be carried too far; there should be a means of classifying the diseases; the pavilion principle should not be lost sight of in the wards, which should be well lighted and ventilated, and verandahs or other means of obtaining fresh air for the convalescents should be considered. There should be a small room or two for special cases of an infectious or acute nature, and there should be few, if any, long corridors. We cannot say that any of the competitors have realised satisfactorily these requirements. "Triangle in Circle," which we place first, makes a too-long entrance corridor to the wards placed at right angles to each other, at one end of building. The kitchen at side of entrance, though closed off by a screen, is inconveniently placed, and the convalescent room would have been better located somewhere nearer the main wards. On the other hand, there are a few good points; the wards, each 27ft. 6in. by 16ft. 6in., for five beds each, are well lighted and ventilated by side windows; the lavatories and bath-rooms at the ends are well placed, and the nurse's room at the angle between the two wards is convenient, inasmuch as one nurse may control both wards from her inspection windows, and attend to the wants of both classes. A special ward is provided, and the building is economically and simply grouped externally in an appropriate style. We do not like, however, the outer junction of ward-roofs. Fresh air is proposed to be admitted by Tobin's ventilators, and by the Manchester grate, and the foul air extracted by Boyle's ventilators in connection with combined smoke and ventilation flues. "Omega" has a fair arrangement of wards placed endwise, with matron's room between, and bath-room and w.c.'s at ends; the convalescent room, and verandah attached are convenient; but we think the operating-room too near the wards, and there is a want of skilful planning in the administrative part generally—the kitchen being absurdly out of the way. Style is suitable. "Be to its merits very kind," &c., adopts a more scientific classification; the sick-wards are placed at the ends of the front block, comprising matron's and nurse's

sitting-rooms; the entrance is in centre. Behind each ward is located a nurse's-room and convalescent ward; the lavatory and w.c. are placed in a projection from ward, but are not intercepted enough. There is a verandah leading out of convalescent-room; the latter has its separate w.c. at end of corridor which connects the two wings. Projecting in rear, opposite entrance, is the operating-room; a kitchen with side-covered passages to wards, scullery, and offices. The kitchen is thus isolated yet near, and at equal distances from each ward—a desirable point of economy. The author proposes air-ducts at sides of wards with vertical channels at heads of beds, central stove, concrete walls with timbering, and adopts a suitable style. We like less the alternative sketch. The cubing is put at 7d. and comes to £2,386. Considerable ingenuity in plan is also evident in "North West." The wards form the end of an L-shaped building, the kitchen and hall occupying the inner angle. The convalescent, nurses' bath-rooms, and linen-closets are well placed, and but for the want of a room for special cases, and attention to other sanitary details, this design stands well in the competition. Motto "J." is clever as an elevation. It is a single-story building with front verandah and projecting convalescent-rooms; the wards are judiciously divided at each end, one room being for three, and the other for two beds, but the conveniences are quite out of the way, and the kitchen and stores not central. There is a want, in short, of administrative convenience. The bird's-eye sketch is pleasing. "Yesram" places the wards at the ends of a long corridor with through ventilation and end light. They have four beds each, and one room for another bed adjoins; the closets project at side of ward; the convalescent-room and matron are in centre of block, but the kitchen is not central, and we do not know what the "administration-room" means. There is a great want of economy evident; the south elevation is designed as a suitable one-story range. "Norwich" fails in placing his closets and lavatories in the centre instead of on the outer side of wards; the kitchen offices are central in the rear; the matron's-room facing entrance is surrounded by corridor, side-doors closing off the male from the female corridors. There is a good principle evident in the classification, but a very hotch-potch external grouping is the result. Hot water and open fire-places are indicated. "Sin Circle" is a carefully executed set of drawings; there is nothing much amiss with the wards, which are pavilion, with intercepted closets; the nurse's and convalescent-rooms are convenient, and the kitchen is placed centrally, leading out of a large central hall. Considerable area is taken up, and a more condensed arrangement of the administration offices would have been better. The author shows the details of closet connection, and man-holes, and the mode of heating and ventilation. Open fireplaces and hot-water are combined with fresh-air inlets, the foul air finding vent in ceiling communicating with horizontal shaft and furnace flue. A Domestic Tudor style is adopted. The fault of "To be or not to be" is that the administrative offices are ill-proportioned to the wards. Why the prodigious building above, and where are the nurses' rooms? Wasteful of space, wanting in classification and economy of service are the general attributes of several other designs we have received, to which we can only refer as a class. "Such a Dog," "Anchor," "Con Amore," "Pecksniff," "M. with Leaves," "Try," "Omnia Vincit Labor," "Cyn-rac," "Melina," "Ogmore," "Cariose," "Olive Branch," "Signum," "G and J in Square and Circle," "Rusticus," "Amateur," "First Attempt," "Cyclops," "J.S.," "East Anglian," "Burswell," "Ich Dien," "Herat," "Elève," "Tam O'Shanter," "Essayez," "Amphion," "Ubique," "B. M. W." are of this number, though some very creditable drawings are to be found among them. The plans are either straggling or they show a building two or more stories high—with superposed wards—certainly a very undesirable mode of construction; in one case the author has a quadrangular arrangement, with centre garden and surrounding corridor, along which are ranged the several rooms. Another plan shows an angular disposition of wards forming the letter A. It would be impossible for us to criticise in detail the several plans. In many cases the wards are not provided with suitable conveniences; there is no linen-closet or nurses' room; the entrance is incon-

veniently near to the ward or kitchen, while the latter is placed quite a journey away from the patients; the operating-room, instead of being in a part of building shut off from the wards, is often unpleasantly near them, and there is a want of attention to other matters of sanitary importance.

DESIGNS FOR CHIMNEY-PIECE.

We have received numerous sketches for this subject, but we are sorry to say not one of them comes quite up to our expectations. "Memor Esto," which we place first, shows a chimney-piece of English Renaissance somewhat after the style of the Adams Brothers, the jambs being relieved by Ionic capitals, springing from inverted pedestal-like compositions. The frieze is festooned. Above the mantel-shelf the breast of chimney is adorned by a centre mirror, side-shelves, a coved top with space for china, and a broken pediment above. The treatment is quiet in effect, though the panelling is a trifle overdone. The author proposes French grey and white, the hollows to be picked in with gold, the cove to be in stamped gold leather. "Be to its merits very kind," &c. sends two designs both marked by simplicity of outline without extravagant or numbing ornament. We like the right-hand sketch the best with consoles to jambs. It is a Classical composition with pilasters and mirrors, divided into two tiers by a centre entablature, and without much projection. The decoration is confined to three shades of olive green with emerald mouldings to mirrors, varnished. The other sketch shows a bevel-edged mirror placed upright, quite square, with cove and shelf above, the sides having lockers and shelves for china, with glass panels between. The only fault we have to find with it is the want of depth of moulding at top. "Noah" sends a clever sketch with pier-glass, at the sides of which project cut brackets forming angular niches for shelves. An entablature projects over mirror, the upper surface intended for busts or vases. The chimney-piece is simply treated, of Sicilian marble, with a centre panel of Wedgwood and outer moulding. The side jambs show an inlay of green marble. We do not like the overhanging appearance of the angular shelves, though the general design is spirited. "Nemo" is too heavy in the jambs and upper pilasters; the Ionic pilasters are too wide; in other respects the design is quiet and not over-fussy, and the only place for brie-a-brac is on the top cornice, a deep cove surmounting the glass. "Veritas Vincit" is not devoid of merit in the simplicity of the fireplace and upper framing; the details are good, and the pillars and shelves light. "Owl" has also a very simple outline in the shelves above mantel, but spoilt by the cut fringes and brackets. Above the glass is an arched recess for china, lined with gold pattern stamped leather. We do not admire the whimsical iron dog. "Black Star in Circle" is spoilt by the side ramps which overhang the mantel-shelf, and the pediment is top-heavy; without these the design would have been appropriate. "Yes, or No" is simple and effective in the upper lockers and places for china, but the hollow below mantel-shelf, and the nondescript chimney-piece spoil all. "James" sends a plain and effective composition, but the brackets are tawdry. "T. W. P." is weak in the balusters supporting side shelves, and the design is over-panelled. "Maltese Cross" adopts a heavily framed glass with curved pediment—rather commonplace. "Steffano" is flimsy and the detail poor. "J. C. in Circle" falls into a rather stereotyped treatment of the upholsterer's type. "Pat" glories in a kind of acrobatic frontispiece; it puts us in mind of a wizard's table with magic bottles, wands, and inverted pillars. Why make the pillars diminish the wrong way? We must place "Amateur" in the same category. His sketch shows a projecting chimney-piece with heavy angle pilasters supporting huge brackets carried up to the ceiling. These are richly decorated, and over the glass is an elaborate arched recess for china. The whole conception is in a "loud" and ponderous style of ornamentation—a kind of mixture of Assyrian and Renaissance. Of other designs we can name only in order of merit—"Owd Nick," "K in Circles," "Club in Circle," "Try," "Through," and "Dagger," "Dunwich," "Signum," "Spider," "Ivy Leaf," "Belteshazzar" and "Ogmore." Many of the latter are in a nondescript kind of design, and indicate want of study of good examples.

The thirteenth annual exhibition of the Irish Fine Art Society has been opened at the Leinster lecture hall, Dublin.

GLASS.*

ANOTHER useful little art handbook has been issued by the South Kensington Museum authorities upon "Glass," written by Mr. Alexander Nesbitt, F.S.A. Like the previous handbooks, that of Mr. Nesbitt aims at giving the reader a clear account of the origin and history of the substance treated on as exemplified in the specimens at the South Kensington collection. An instructive chapter on the "Composition of Glass" commences the book, in which the chemical ingredients are pointed out and the various colours used in the manufacture of coloured glass. Thus we have it stated on Dr. Ure's authority that common window-glass is a compound of silicate of soda and lime, sometimes also of potash; and that plate glass contains silica, soda or potash, lime, and alumina. Venetian glass, it is stated, was made "like Roman, principally with soda; but it appears from the receipts given in some 15th-century manuscripts, which have been recently printed, that a mixture of potash obtained from the lees of wine was used. In France potash procured from fern seems to have been the alkali used throughout the middle ages." Speaking of the colouring powers of different bodies, M. Bontemps, at the British Association meeting at Birmingham, showed "that all the colours of the prismatic spectrum might be given to glass by the use of oxide of iron in varying proportions, and by the agency of different degrees of heat; the conclusion being, that the colours are produced in their natural disposition in proportion as the temperature is increased. Manganese, copper, silver, gold, and charcoal were all found to produce corresponding results; gold, for instance, giving a great many tints, varying from blue to pink, red, opaque yellow, and green."

Sketches of the history of glass are given, including Egypt, Phœnicia and Greece, Rome and provinces, Byzantium and the eastern provinces, Persia, India, Italy, France, Spain, the Low Countries, Germany, British Islands, and China, and from these many interesting facts may be learned. We see the author refers to Dr. Schliemann's discoveries at Ilium and Mycenæ; and observes that while no fragments were found at the former place, Dr. Schliemann mentions some discs of glass, believed to have been door-ornaments, he had discovered at Mycenæ. These discs, Mr. Nesbitt says, appear to be of the same character as those found at Ialysos in Rhodes, which vary in size from that of a sixpence to a florin, having rosettes pressed from a die. Dr. Schliemann, however, expresses a doubt whether some of these discs are not made of pottery. Mr. Nesbitt's chapter does not give the reader any account of the imitations of precious stones which the Egyptians are known to have made, nor that the glass made was generally opaque—a fact that accords with Dr. Schliemann's discovered relics. The fact stated by Stuart and Revett, that in the capitals of the portico of the Temple of Minerva Polias a torus inlaid with coloured glass was found is alluded to. The remarks on Roman glass will be found to contain much that is interesting. At South Kensington many examples of Roman coloured glass may be seen, comprising opaque red, and glass imitating jacinths, sapphires, glass, black, &c., with the exception of murrhine, described by Pliny, but which appears to have puzzled classical scholars to define. It is probable, the author says, that murrhine was a variety of agate containing shades of red or purple produced by heat as in onyxes. This chapter is illustrated by some ancient glass bottles of globular or pear-like shape; one of them represents a species of reticulated pattern made by combining sticks of various colours resembling the Venetian "mille fiori." These are of every conceivable shade and hue in combination, violet being the ground colour generally. Allusion is made to gems, cameos, and ornaments, and to the opaque red glass, and amethystine found embedded in pavements in combination with marbles, as in the House of the Fawn at Pompeii. Pavements of green glass about the thickness of a tile have been found at the Isola Farnese, near Rome, and many of these fragments have been discovered in explorations in many old towns—London especially. Walls were similarly lined, and specimens are to be seen at South Kensington, Nos. 886 to 895, '75.

In some cases figures of animals and men were represented, but patterns seem to be commoner. Glass for windows is briefly referred to. Lactantius in the fourth century refers to it, and slabs of marble, with small apertures formerly filled with plates of glass, still exist in Rome. Some beautiful enamelled Oriental specimens are illustrated; of these we may mention enamelled lumps of the Byzantine period, found in the mosques, examples of which are to be seen at Kensington. They have rich diapered patterns or arabesques, with birds and animals. The Glass of Italy is an interesting chapter. We quite agree with the author that the "vast undertaking of covering the interior of St. Mark's Church with mosaic had a most important effect upon the supply of glass in Venice; for if the manufacture already existed it would unquestionably receive a great impulse; if it did not exist, the presence of Byzantine artists and workmen skilled in such matters would lead to the discovery that the 'lagunes' possessing abundance both of fine sand and of maritime plants yielding alkali were well fitted for the seat of a manufactory of glass. Early in the 13th century it is clear the Venetian glass manufactory had become one of considerable importance, the taking of Constantinople in 1204, having contributed to that result. Documentary evidence of the regulations imposed on the various sections of glassworkers corroborates this fact. One interesting incident is recorded. In 1376 it was enacted that the marriage of a noble with the daughter of a "vetrajo" should not impede the descent of nobility to the offspring; and on the 15th March, 1383, a set of regulations were issued with the view expressed in preamble, "ut ars tam nobilis stet et permaneat in loco Muriani." A few unique specimens are engraved, as a Venetian beaker, a ewer, a jug of "mille fiori," and a grotesque vessel. During the 16th and 17th centuries the Murano glass was noted throughout the world; but in the 18th century the manufactories of England, France, and Bohemia began to compete with it, and the fall of the republic hastened its decline. The secret of the beauty and lightness of the Murano glass has never yet, it would appear, been divulged, though its strength is said to depend much upon its containing lead, like our flint-glass. A very interesting section is that devoted to the glass in the Low Countries and Germany. The engraved specimens of drinking-vessels with raised bosses are particularly unique. Coming to our own country, the subject is briefly sketched, and the earliest positive evidence of glass-making is supposed to be a contract made in 1447, when John Prudde, of Westminster, covenanted not to execute the windows of Beauchamp Chapel, Warwick, with the "glasse of England," showing that an inferior kind of glass was made, and that the Low Countries and France, together with the Muranese, supplied our wants largely at this period. Soon after, however, in the following century, Venetian glass appears to have been made in England, at the Crotchet Friars in London, if we can trust Stow and other evidence. But we cannot in this short notice give other incidents, and must refer our readers to Mr. Nesbitt's book, which will be found a concise and popular manual upon this most interesting art manufacture, and no student who visits our national collections of glass should go without it.

ROMAN ANTIQUITIES IN GLOUCESTER-SHIRE.*

A SMALL quarto volume upon the Roman constructions explored in Lydney Park by the Hon. C. Bathurst in the early part of the present century has just been published by C. W. King, M.A., Fellow of Trinity College, Cambridge. The Roman station in Lydney Park is situated about a mile and a half from the western side of the Severn, about twenty miles below Gloucester. The position is skirted by a range of hills, and the Romans found it a commanding site, as communication with the other fortresses on the opposite side of the river could be maintained by signals. In 1805 the foundations of old walls were accidentally hit upon, and the Hon. C. Bathurst determined to continue the excavations, which were carried on

for some years. The walls were laid down on plan, the pavements were copied, and a whole range of buildings occupying an area of upwards of 300 feet square was revealed. These contained—first, a residence in square form, with an atrium in the centre, surrounded by a cryptoporticus; the pavements of the apartments and galleries, found in fragmentary pieces, were of mosaic of exceedingly elegant patterns of Græco-Roman design, in blue and red tesserae. Coins of several Roman emperors, extending from Augustus to Arcadius, were also discovered; and these are carefully catalogued in the book. Another portion of the buildings was probably used as baths, while a third part found is clearly the foundation of a temple, 93ft. by 76ft. The late Mr. T. Bathurst prepared a summary of the discoverers' description, and the present editor has added notes which make the original memoir of still more interest to the archaeologist. Mr. King advances many theories bearing upon these discoveries, pertaining to the dedicatory inscriptions, and the nature and powers of the deity to whom the temple belonged. The plates illustrating Mr. King's edition are numerous, though some of them are not equal to the occasion, and are drawn with an uncertain hand. The tessellated pavements are certainly fine examples. They consist of tesserae of white and blue lias, and of broken tile for the red colour. The designs show *guilloche* borders, intersecting squares, circles, imitation of matting, and beautiful curvilinear forms. In all of them the blue is the predominant colour, and, altogether, they are very striking specimens of Roman paving. Plate 8, the "Oracle of Nodens," shows a singular circular opening in the pavement, which the author thinks was intended to receive libations poured to the "God of the Deep"; these were drunk up by the dry soil beneath. In the description to Plate 8, "The Dedication," the editor supplies the missing letters of the inscription, and makes it read as follows:—"To the greatest God, for the second time, Flavius Senilus, Head of the Religion, has erected this, from voluntary contributions, the Director of the works being Victorinus, interpreter for the Latin tongue." The relics comprise combs and knives, in iron and bone, wheels, ornaments in bronze. Plate 18 shows a view of the hypocaust under one of the rooms. Iron lamp-stands, implements, namely, a hoe, hatchet, and axe, are also illustrated, but the most interesting of all, probably, are the terminal figures in Plate 30, to which an appendix is devoted. The Roman origin of these figures has been disputed. They are really "Hermæ," colossal busts, on plinths of solid stone. One is a faun, the other a lady, but both have lost their noses. Mr. King thinks the lady's coiffure indicates exactly the age of the rebuilders of the temple, though others have assigned them to Renaissance times. He, however, believes the Lydney Hermæ "stood before the pilasters, bearing up the pediment of the Temple of Nodens, in company with two or four others." As a scholarly description of this British Pompeii, we commend Mr. King's work to all lovers of antiquity.

The restoration of St. Peter's Church, Sowerby, near Halifax, has been carried out during the past few months. The roofs have been repaired, and the whole of the plaster ceiling of the nave renewed. The old square pews of oak have been removed, the woodwork being re-used as open seats, and the three-decker pulpit and reading-desk has been replaced by more suitable furniture. The organ has been removed from the west gallery to the east end of north aisle, and at the corresponding end of the south aisle a vestry has been formed. The floor of the chancel has been raised, and the passages throughout the church will be laid with tiles. Heating apparatus by Lunley, of Halifax, has been laid down. Mr. Middleton was the architect, and the works have been carried out by Halifax contractors, the masonry being taken by Mr. Crawshaw.

On Wednesday, Feb. 26th, the memorial stone of the new East Cliff Congregational Church, Bournemouth, was laid. The church will be 69ft. long, by 40ft. wide, without the entrances, but including the apse. Including the gallery, sitting accommodation will be provided for 650 worshippers, the pews being of pitch pine. The interior will be divided into two aisles. The building is to be carried out in white brick, with stone dressing and moulded brick reveals to windows. The tower will be 90ft. high. The estimate for the church and schools, not including heating apparatus, is £4,013. The architects are Messrs. Kemp-Welch and Pinder, and the builder, Mr. J. Pike.

* Glass. By ALEXANDER NESBITT, F.S.A. With numerous Woodcuts. Chapman and Hall, Piccadilly.

* Roman Antiquities at Lydney Park, Gloucestershire. A posthumous work of the Rev. W. H. BATHURST, M.A., with Notes by C. W. KING, M.A. London: Longmans, Green, and Co.

Building Intelligence.

BELVELLY, Co. CORK.—The tender of Mr. S. Thomas has been selected (in a limited competition), for erection of four pairs of farm-labourer's cottages, farm-house and school-house, on the Belvelly estate of Mr. Smith Barry (formerly M.P. for Co. Cork). The several works will be executed in Belvelly red stock bricks, Bower's white facing-bricks and moulded bricks being used wherever considered necessary. Roman pantiles will be used in the covering of the roofs throughout. The works have already been commenced, under the superintendence of Mr. Wm. H. Hill, Cork, the architect.

CLEVELAND.—On Thursday week the re-opening of the newly-restored church of Carlton-in-Cleveland took place. The new edifice, which is constructed from designs prepared by the vicar, is in the form of a cross, and composed of freestone from quarries in the neighbourhood. There are north and south transepts, each about 14 feet square. From the centre of the building rises a wooden bell turret, tapering to a point, and surmounted by a small metal cross. Accommodation is provided for 250 persons. The restoration has cost about £800.

COTTINGHAM.—A new Wesleyan chapel has been recently opened at Cottingham, near Hull. Accommodation is provided for about 600 persons. The building is in the Italian style of architecture, built of white bricks, and liberally relieved with Bath stone, giving it a handsome and massive appearance. The interior is fitted up with all the modern appliances for comfort and convenience. The front of chapel is inclosed with handsome iron fencing, gates, &c., with piers and walls in harmony with front of chapel. The cost of the building is about £3,000; and the scheme provides a large school and classrooms at the back of chapel, yet to be erected, at a cost of about £1,000. The architect is Mr. W. Ranger, of Finsbury-pavement, London. Mr. F. Blackburn, of Hull, is the contractor.

KILBURN PARK.—A new Bible Christian chapel was opened at Kilburn-park on the 9th inst. The chapel seats 500 persons on floor and in galleries. Ministers' and stewards' vestries are placed one on each side of pulpit, with lavatory and conveniences. The basement provides school room about 40ft. square, and w.c. arrangements for boys and girls, also kitchen, &c. The whole building is heated with air, by Truswell and Holden's apparatus. The entire cost of the building, including lighting, fencing, gates, &c., also architect's commission, is £2,500. Mr. W. Ranger, of Finsbury-pavement, is the architect; and Mr. John Allen, of Kilburn, the builder.

METROPOLITAN BOARD OF WORKS.—On Friday a deputation from St. Luke's Vestry appeared in support of a memorial asking the Board to advance or allow the Vestry to borrow the further sum required to complete the Golden-lane improvement. It was stated that £69,570 was still required to complete the works, upon which £105,780 had been expended. Mr. Richardson severely commented on the conduct of four or five members of St. Luke's Vestry, who had trafficked in land required for these improvements in defiance of the principles which should regulate local self-government. The memorial was referred to the Works Committee. A second deputation from the vestries of Kensington, Chelsea, and Paddington appeared in support of a joint memorial, asking the Board to rebuild the bridge over the Grand Junction Canal, in Ladbroke-grove-road, Kensal-green, which is narrow, inconvenient, and unfitted for the huge traffic which passes over it. The estimated cost was between £7,000 and £8,000. This was also referred to the Works Committee. The Hackney District Board were granted permission to borrow £10,000 for paving works; and permission was also given to the Chelsea Vestry to borrow £20,000 for wood paving. A loan of £2,976 was granted to Kensington for sewer works. In compliance with a memorial from Bermondsey and Rotherhithe, it was unanimously agreed to rescind a resolution by which consent was refused to the construction of any of the Southwark and Deptford Tramway Company's schemes, and the following lines of tramway were sanctioned:—From Old Kent-road along Bermondsey New-road and Grange-road to near Spa-road; from Grange-road along Spa-road to Jamaica-road; from Spa-road along Jamaica-

road, Union-road, Deptford Lower-road to Plough-road; from Plough-road along Deptford Lower-road and Evelyn-street to New King-street; and from Spa-road along Grange-road, Blue Anchor-road, Raymouth-road, Rotherhithe New-road, to Deptford Lower-road. It was agreed that the experiments with the electric light on the Victoria Embankment be continued by the officers of the Board, on reduced terms offered by the Société Générale d'Electricité, for a period not exceeding three months.

ST. SEPULCHRE'S CHURCH, HOLBORN-VIA-DUCT.—The works at St. Sepulchre's Church, which had been stayed for some time, were resumed on Monday, under a recent order made by Dr. Tristram, the Chancellor of the Diocese of London. Application, it will be recollected, was made by the churchwardens of the City portion for further powers, under a faculty granted for certain repairs, and the churchwardens for the Middlesex portion objected to the proposed alterations. The matter went before the Consistory Court and was adjourned, the learned Chancellor expressing an earnest hope that the parties would come to an arrangement. The parties went before the Chancellor a few days since, and a "compromise" was effected. A sum of £8,000 had been allowed by the Court of Chancery for the restoration or reparation of the church. By the order the Middlesex portion withdrew the objection, and both parties were desirous that the works should proceed in the manner agreed upon in the memorandum of compromise mentioned, with the exception of the lowering of the floor of the church being only one-half of the depth proposed in the plan.

TWESKESBURY ABBEY.—The restoration of this noble specimen of Mediaeval architecture has been in progress during the past few years, and is now approaching completion. A great change has been effected in the building by the removal of about an acre of two coats of whitewash, and the clearing away of pews, galleries, organ-loft, lath and plaster partitions, &c. The work in the choir, transepts, and ambulatories is now finished, with the exception of the laying of the tile pavement and the arrangement of the old stalls in their original position beneath the tower, with the organ above them on the north side. In the nave the stone vaulting has been thoroughly repaired, and portions of the old colouring renewed. The chapels round the apse have also been repaired where necessary, and a new roof added to one which has long been in a ruinous condition and cut off from the church. A considerable portion of the sum already expended was contributed by the inhabitants of Tewkesbury and the counties of Gloucester and Worcester. Upwards of £10,000 is still needed to complete the work, and enable the building to be opened free of debt in September next, which is the time fixed for the re-opening services. A meeting convened by a National Committee appointed in March, 1877, is announced to be held in the Library at Lambeth Palace (kindly granted for the purpose by the Archbishop of Canterbury) on Friday afternoon, the 28th inst., at which Sir Michael Hicks Beach, Bart., M.P., will preside. The object of the meeting will be to call attention to the progress and present position of the restoration of the Abbey, and to present a report of the work accomplished since the meeting held at Lambeth in March, 1877. Mr. J. Oldrid Scott, who is continuing the restoration commenced by his distinguished father, the late Sir Gilbert Scott, will also read a paper; and drawings, plans, and objects of interest connected with the Abbey will be exhibited in the Library.

The restoration of the parish church of Caversham is now being rapidly proceeded with. The old wooden tower has been demolished, and a substantial one, 56ft. in height, built of flint, has been raised in its place. When the alterations are finished, the sacred edifice will consist of a nave and two aisles. The style is Early English. The alterations are being carried out from plans prepared by Messrs. Morris and Stallwood, architects, of Reading, Messrs. Wheeler being the contractors. We illustrated the designs for restoration last year.

The great window in the south transept of Chichester Cathedral is being filled with stained glass. The window is a fine specimen of Decorated Gothic, and measures 47ft. by 27ft.; it was erected by Bishop Langton early in the 14th century, and was then filled with painted glass, which was destroyed when the city fell into the hands of the Parliamentarians. The new glass is being manufactured in France.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.
[Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.]

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Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—T. W. H.—W. V. G.—S. L. B.—W. D. M.—W. M. F.—H. and Co.

E. W. P. (Address the letter here. We do not know the price of the book. Write to Mr. Murray.)—A. S. Oldrid Scott. (Messrs. Allen and Son, 62, Tabernacle-walk, E.C., can give the information.)—A. A. (We do not know the publisher or price of the book named. A rough test for the presence of impurities in drinking-water is to mix therewith a small quantity of permanganate of potash: if pure, the water will remain of a pinkish tinge; if otherwise, it will turn a muddy brown. It is dangerous to use the same cistern for the supply of the water-closet and the ordinary wants of the household.)—E. Goff. (If the windows have a right of light by prescription, the owner can, doubtless, object legally to the raising of the opposite party's building.)—T. O. THOMAS. (We thank you for your commendations. We have no knowledge of the work you mention. There is a course of Practical Geometry and Plan Drawing by C. W. Pusley. Perhaps you mean this. If any such work exists, you might get it by applying to Messrs. Batsford, of High Holborn.)—CONSTANT READER. (Having given the final certificate, it is not usual for the architect to afterwards certify to the indiction of penalties, unless there are "extras" still unpaid.)—T. P. HIGGINS. (For carpenters, Newland's "Carpentry and Joinery," published by Blackie, will be found a useful book of reference. Weale's series has also some useful treatises.)

"BUILDING NEWS" DESIGNING CLUB.

ARTHUR HARTLEY. (The three stories are exclusive of basement.)—PETER. (Your drawing came too late for review.)

Correspondence.

"A NATIONAL STYLE OF ARCHITECTURE."

To the Editor of the BUILDING NEWS.

SIR,—In your issue of last week a correspondent, "19th Century," asks "Who is the successful designer of the present day?" and adds, "Not the architect, but the engineer." This is humiliating, and compels one to ask, Wherein have architects erred; and wherein have engineers surpassed them in the stability and beauty of their structures? I readily admit that the "engineer is a thinker, a designer and applicator of mechanical contrivances to meet present requirements." But is it not outside the bounds of truth to say that "The architect is a copying clerk to old forms?" The genius of the architect is to a great extent distinct from that of the engineer; but let "19th Century" look at the shop-fronts of the present day, with their iron columns and

large plate-glass windows; let him compare the light and inexpensive structure of our modern theatre with that of Syracuse or the Coliseum, and say if the architect of the present day is a "mere copy-clerk to old forms." We have a style of art exclusively our own; well suited to the social and commercial requirements of the present age. I quite agree with "19th Century" in his just censure of those who ignore or overlook the principles so faithfully carried out by the ancients, and who, regardless of principles, reproduce in Britain what was adapted only to the climate or constitution of Greece or Rome; but surely that gentleman is not himself so blind to principles as not to observe that in general the architecture of our day can claim originality consistent with principles. Like him (if I understand him aright), I am not an admirer of Queen Anne; but I contend that it was the logical deduction of reason that to a great extent suggested such a style. We know that both Greeks and Romans, as also the inventors of the Gothic style, constructed their buildings to suit the various building facilities of their times; and displayed their genius in the skillful manner of arranging and moulding their stones. English architects cannot command the stone quarries which they possessed—with them brick takes the place of stone; and surely it is an honour to the architect who invents and adopts a style suited to the materials at his disposal, and thus triumphs over the natural ugliness of brick. This, I think, is paying due heed to the principles of Art. I observe that in Scotland some architects are adopting Queen Anne, but simply because it is in place in England. It is a disregard of principles to introduce it into Scotland, where there is abundance of stone. I trust, therefore, that we will not again be told that architects are mere copy clerks. As to that unfortunate smoky fire-place, "19th Century's" remarks are quite in point; but if I could induce him to bring engineers down to the level of architects, I could furnish an instance where an engineer constructed a fireplace and neglected to give sufficient recess for the dog grate. The consequence was that it smoked annoyingly, and soon the ornamental arched lintel cracked with the excessive heat, necessitating more expensive alterations than the application of a glass smoke board. But it is useless and unjust to take such isolated mistakes as a reason for wholesale condemnation.—I am, &c., A LOVER OF ART.

STRENGTH OF PORTLAND CEMENT CONCRETE.

Sir,—Owing to the failure of a large number of cement concrete pipes used for the drainage in Bournemouth, an investigation as to the strength of the concrete took place, the results of which are valuable, and I herewith tabulate them. All the pipes were about two years old:—

Thirty-five tests upon the tensile strength per square inch on 2-25 briquettes.

lb.	lb.	lb.	lb.	lb.	lb.
145	290	355	420	456	480
213	339	368	430	473	491
239	340	385	431	475	505
273	344	392	440	475	529
283	350	393	450	475	554

Average 231 333 378 434 471 512 598

Ten tests upon concrete pipes 2ft. internal diameter, 2ft. length, 1½ in. substance, with central load.

No. 1 pipe	lb.	No. 6 pipe	lb.
" 2 "	1,818	" 7 "	2,520
" 3 "	2,772	" 8 "	3,360
" 4 "	2,520	" 9 "	3,192
" 5 "	2,853	" 10 "	3,924
" 6 "	2,683	" 11 "	3,360

Average 2,536 Average 3,091

Ten tests upon tensile strength per inch of pipes of the above pipes similar in number.

No. 1 pipe	tensile.	No. 6 pipe	tensile.
" 2 "	213lb.	" 7 "	239
" 3 "	239	" 8 "	243
" 4 "	243	" 9 "	246
" 5 "	246	" 10 "	249
" 6 "	249	" 11 "	254
" 7 "	254	" 12 "	259
" 8 "	259	" 13 "	263
" 9 "	263	" 14 "	267
" 10 "	267	" 15 "	271
Average	233	Average	233

Six tests upon compression.

No. 1 pipe	per square inch compression.
" 2 "	2,684lb.
" 3 "	3,672
" 4 "	3,955
" 5 "	2,825
" 6 "	4,340
" 7 "	3,250
Average	3,454

The above tests were made on behalf of the manufacturer, and are the most favourable tests he could obtain.

The tests upon the five pipes, and giving the tensile and compressive stresses of the concrete of each of these pipes are exceedingly valuable, as it furnishes two methods of ascertaining the transverse strength of the concrete: one by direct investigation of the transverse strain exerted on the pipes by the load; the other by calculation from the average tensile and compressive stresses, and it speaks well for the accuracy of these tests that both these methods give the same result of 1·8 as a divisor to convert tensile into transverse stresses or a multiplier to convert transverse into tensile stresses. Some other tests were made not upon the behalf of the manufacturers, and these tests did not give so favourable results as to the strength of the concrete, and are as follows:—

Three pipes sealed at the two ends and burst with water.

No. 1 pipe	per square inch tensile.
" 2 "	96lb.
" 3 "	160
" 4 "	224
Average	160

Five tests on the transverse strength per square inch, and converted into tensile by multiplying by 1·8.

lb. per square inch transverse	lb. per inch tensile.
57·4	= 103
67·0	= 102
98·3	= 178
113·4	= 204
114·0	= 205

Average 90 Average 162

From the whole series of tests it is evident the difficulty of obtaining uniform strength of concrete in these concrete pipes had not been overcome, and there is no wonder their use led to such disastrous results, when the strength varies so much as from 1 to 7, and even averages of five samples vary nearly in the proportion of 1 to 4. The tests are, however, most interesting on account of the very great strength of some portions of the concrete; but until some steps can be taken to obtain uniformity of strength the lowest strengths will be those upon which to base construction. A. C. P.

DISTRICT SURVEYORS' FEES.

Sir,—When I wrote respecting the above, I did so hoping to elicit a somewhat more unbiased opinion than that of the plaintiff, as to whether in the event of more than one contractor being employed at the same time, in making alterations to the same building, the District Surveyor was entitled to a notice and a fee from each. Mr. Kerr's statement that "each builder becomes liable for his own fee" does not convince me. True, Mr. Newton ruled that Messrs. Adams should have given notice; but take a similar case, Kerr v. Strode, and it will be seen Mr. Knox ruled the reverse, stating the Building Act was passed for the protection of the public, not for the multiplication of fees. Of course Mr. Kerr says "the law is that Messrs. Adams shall give the district surveyor notice," Mr. Newton having given decision to that effect, and of course Messrs. Adams would say it was unnecessary, Mr. Knox having decided a case favouring their views. In the midst of conflicting opinions, I was in hopes someone would have quoted a case from a superior court showing what "the law" really was. When I know this, I for my part shall be quite ready to see that district surveyors, amongst whom I number many friends, get their legal dues, and not "a substantial abatement only,"

for I am well aware that in many cases the authorised fee is an inadequate remuneration. Mr. Kerr says he cannot accept my account of the facts, but does not attempt to refute it. He also asks "supposing the Club House had been burnt down, would the district surveyor have been responsible for negligence, under Messrs. Wontner Smith's notice?" I answer, Certainly not; for let the notice be perfect or imperfect, no such responsibility rests with the district surveyor, and I challenge him to produce an instance where he or any other district surveyor has been so held liable; moreover, I may inform him that the usual insurance for extra risk whilst workmen were employed was paid, and that the contract for steam-piping and cooking apparatus, particulars of which he had so much difficulty in obtaining, simply because he never asked Messrs. Adams, myself, the clerk of the works, or foreman, consisted merely of one new hot closet and steam-pipe to same, repairing and replacing another hot closet, and supplying a small gas-oven; that the pipes supplying steam to the hot closets could not by any possibility ever set fire to wood, even if touching it, can be seen at once by anyone understanding such matters, and is proved by the fact that for upwards of twenty years the pipe from which Messrs. Adams brought a branch to supply the new hot closet has touched wood without even scorching the paint, the boilers being worked at a pressure of from two to three pounds only. Mr. Kerr also alludes to what he calls my "shabby quibbles." This is scarcely courteous language for one gentleman to use towards another; but I can well afford to let it pass. His hope that I may myself one day be a district surveyor is doomed to be frustrated, for if there were half a dozen contractors employed on every building, and a fee paid by each, I must say I am too fond of my profession to give my time to the mental struggles involved in attempting to interpret the mysteries of the Metropolitan Building Act. If this statement renders his case the stronger, I am happy to give him the benefit of it.—I am, &c.,

HUGH ROUMIEUX GOUGH.

COLOUR IN ARCHITECTURE.

Sir,—I was pleased to see the letter from Mr. Hughes, explaining further your report of a paper read upon the above subject by Mr. J. W. Tonks, before the members of the Birmingham Architectural Association. Mr. Hughes tells us that Mr. Tonks was certainly at fault in mistaking red-stone for terra-cotta at the Grand Hotel, but that it was a mistake "not worth notice." If Mr. Hughes should ever be tempted to put in red-stone with the idea that it will retain its colour like terra-cotta, he will find in the course of a few years that he has made a mistake worth a good deal of notice. The stone in that time will be as dull as rusty iron, while the terra-cotta would have remained nearly as bright as ever. The same thing applies to granite and coloured marbles: the former will retain its colour, the latter will not. I repeat that Mr. Tonks was misleading your readers when he said it was but little affected by the atmosphere. It should be borne in mind that your journal is accepted as a useful medium of education by thousands; and that, therefore, it is the duty of everyone who detects an error to correct it, before others of less experience have time to commit themselves.—I am, &c.,

A BIRMINGHAM READER.

In the porch under the tower of the new parish church of St. Mary, Newington, S.E., have been placed some relics of the old structure, demolished to widen the roadway of Newington Butts. These include a font of yellow marble and oval in shape, and a massive chandelier, consisting of a centre stem, crowned by a life-size figure of a dove with out-stretched wings, and beneath are three rows of eight arms to support candles; the chandelier was made in 1726.

Premises for an institution for the blind have been erected in Lonsdale-street, Carlisle, and will be opened in a month's time. They have been erected from the designs of Mr. C. J. Ferguson, of that City, at a cost of about £3,000. Mr. Milburn had the building contract, Mr. Davidson that for joinery, and Mr. Johnson that for plumbing.

A new Foresters' hall has just been erected in Great Shaw-street, Preston, from the designs of Mr. Grant of that town. The building is French Classic in style, and contains a meeting-room 65ft. by 27ft., besides reading, secretary's, and three court-rooms. The contracts for erection were let to local tradesmen.

Intercommunication.

QUESTIONS.

[5709].—**Perspective.**—Will any adept at interior perspective tell me upon what line on his picture he places his heights, whether upon the nearest point to the eye on the horizontal line, or upon the station? Also, whether he can recommend any good work upon the above?—*INTERIOR.*

[5710].—**Transparent Varnish for Steel.**—Will anyone kindly inform me of the best transparent varnish for polished steel, to protect it from going rusty and dull, and how to apply it.—*W. S. W.*

[5711].—**Cricketer Pavilion.**—Our club contemplate erecting a superior permanent building. Which are the best and most complete pavilions in London or the neighbourhood? Are there any specially good ones in the provinces?—*COUNTRY WICKETS.*

[5712].—**Lift.**—Can any reader recommend a simple dwelling-house lift (from basement to ground floor only) for a 2ft. 6in. square inside diameter; height 13ft.—*HOIST.*

[5713].—**Wood Worms.**—Would a correspondent advise me what I should do to a piece of antique furniture to rid it of this infection?—*A. C.*

[5714].—**Deficient Quantities.**—In *THE BUILDING NEWS* of September 21st, 1877, there is a question asked by "A Builder" (5132) whether he could recover from a surveyor or proprietor for deficient quantities, and it is answered in the following number, 28th September, 1877, by "Nicholi Filius" to the effect that in a trial, "Coker v. Young" it was held a builder could not recover in such a case. I should deem it a great favour if the gentleman who replied could let me know in what court the case was tried, and who was the surveyor, and his address, or any information that would lead to this. An early reply would greatly oblige.—*W. D. B.*

[5715].—**Staybars v. Stained Glass.**—Will some of your influential readers correct me if I am wrong upon the following questions, for I think they are of more importance to church architecture than many people suppose. I refer to the removal of staybars and stanchions, in order to fix a window of stained glass. I have known numerous instances of both staybars and stanchions being replaced by bits of thick wire inside the glass, to the utter ruin, as I think, of the window externally. I have known staybars of an old Perpendicular window, which had been in place, and firmly loaded hundreds of years, having been removed because a curate or a farmer's wife thought a stained glass window "would be so pretty." I have known a substantial bar connecting and tying the wall plates of a chancel roof, through the springing line of an east window, sawn out to put in very inferior glass. Now, I would ask, 1st. Is it necessary to remove substantial staybars and stanchions in order to insert stained glass? 2nd. Can any artist be found who will acknowledge the ironwork as a necessity, and design his glass to suit it? 3rd. Am I right or wrong in supposing that an old window would be better without the glass than with it, at the loss of the ironwork, and the introduction of a wire tell concealing half the mouldings, and plugged into the stone with great lead plugs? My policy has been of late to persuade all my clients, where I could do so, to be contented with simple geometrical glazing, of such a character as does not necessitate the removal of the ironwork, instead of allowing the stained-glass painter's assistant to damage the architecture externally. I think there will be found many of your readers who have experienced the same difficulties as I; but, if not, I shall be thankful to be set right.—*ARCHITECT.*

REPLIES.

[5701].—**Sewerage.**—The inclination at which "tumbling bays" become necessary, depends, of course, upon the size of sewer to be dealt with, for small sewers require greater velocity of discharge. For sewers of, say 2ft. or 2ft. 6in. diameter, in fall exceeding 1 in 500, should have tumbling bays, and these may be introduced about 300 yards apart, depending on gradient. I should have ventilating chambers at every tumbling bay; the outlets should also be protected by flaps to prevent inrush of air at lower end, and stack-pipes of houses may be turned to account to let out gases at different points.—*G. H. G.*

[5702].—**Sanitary Examination.**—I am not aware of any society, unless it be the Sanitary Institute. I should advise "Golumptions" to apply to the Local Government Board.—*G.*

[5707].—**Haslingden Flags.**—Situate on the hills between Haslingden and Rochdale, there are a goodly number of quarries, on the Haslingden side at Ewood Bridge, Haslingden, Rawtenstall, Clough Fold, and Stocksteads; and, on the Rochdale side, at Whitworth and Facit. In specifications it is usual to say Haslingden or Rochdale flags, sets and curbs. There are various qualities of flags, as best barns, second barns, and common barns. The term barns refers to their original use for barn floors, hence the name. The best barns are of solid rock and self-faced, but not always out of winding. The second barns are of the same rock, but not smooth-faced; the common barns are from the top rock; the sets and curbs are nearly always out of the best or bottom rock; the common barn rock is of a rough kind and shelly, and is used for inferior work. Machinery now plays an important part in preparing the material for the market by being polished and worked by a facing machine, similar to an iron planer. The gauges are 3ft. 2ft. and 2ft. and randoms. The stone is of a superior quality, and is of the second or flag rock of the Millstone Grit series, and is much more durable than Yorkshire stone for paving purposes. Rarely is any other stone used for street work in Lancashire than Haslingden or Rochdale.—*H.*

[5708].—**Hospital Planning.**—Blocks arranged "en echelon" is a term intended to imply that they are placed as a series of terraces, or arranged in step-like order.—*G. H. G.*

[5709].—**Hospital Planning.**—The term "en echelon" can be best explained by supposing the plan of

blocks to assume on ground a diagonal arrangement of parallel blocks, or the appearance of steps without risers, seen in side elevation. I do not know the advantages of the system.—*LUTU.*

[5699].—**Driving Sewer Headings.**—If the sewer is 15 feet deep or more, put up a windlass to pull the dirt up shaft. Sink the shaft 12ft. x 3ft. 6in. in the clear; put wallings in according to the height of ground, 2ft. 6in. or 3ft. apart. Stretch the shaft in centre from walling to walling to form a double shaft, so that one skip can work up and other down. Nail a strip of timber in centre of walling if a flat one, so that the bottom poling boards will lap 3 inches inside the top do. (If round not required); and in filling up the shaft, you can take out the bottom walling, and draw out the poling boards and save timber, and continue removing timber (as you fill up shaft) all the way up if the ground will stand. Nail a board on at each corner of the shaft to hang the walling, and prevent the skips from catching in the timber. Put a small prop in each corner of the shaft, between the wallings. The shaft to be sunk lengthways towards the headings. Put three props at each side of the bottom of shaft to support it, not quite upright, bottom of props leaning toward the sides of shaft, one at each corner, and one in the centre. If the sewer is 20 or 30 feet below the surface, shafts to be two chains apart if a small sewer; if a large sewer, 5 or 10 chains apart, according to size of sewer. Manholes to be put in at half distances for passing and repassing with skips for small sewers, such as 18-inch pipe sewers. Drive headings 3ft. 6in. high by 3ft. wide. Head tree to be 2ft. in clear, if sewer to be for 18-inch pipes. Props under head-tree to be 3ft. in clear at bottom. Distance from head-tree to head-tree according to quality of ground. Put poling boards from head-tree to head tree; the same in sides from prop to prop. Drive heading No. 1. Pull dirt up shaft. Lay pipes at farthest end of No. 1 heading; also begin to drive No. 2 heading. Take dirt from No. 2 heading, and cover pipes in No. 1 heading, and fill up. When No. 1 heading is filled up, lay pipes at far end of No. 2 heading. Lower dirt down shaft, and fill up No. 2 heading same as No. 1. The shafts should be sunk where manholes are required for cleaning cesspools. If large manholes are required, sink the shafts in size accordingly. If large sewer, sink shaft in size according. If dirt is to be pulled up by steam power, sink the shaft round with wooden curbs. Put poling boards in behind the curbs, and props between the curbs. At the bottom of shaft drive small heading, and put in piece of timber longitudinal to support the curb, length decided by width of sewer. Drive heading in centre of sewer, six longitudinal (called sometimes a bar) in centre of heading with prop at each end standing on foot block. Foot blocks should be put under all props. Widen from each side of centre of bar according to size of sewer required. If in quicksand or wet ground, put one bar each side of invert, and fix poling boards close together under bars, so that you can put masonry in centre of invert. Remove bars and continue with masonry; the quantity of timber required depending on nature of ground.—*JOHN J. WELCH, Tiverton-on-Avon, Bath.*

WATER SUPPLY AND SANITARY MATTERS.

STAFFORD.—There being a large influx of salt water into the deep-bore hole which the Stafford Corporation are sinking into the Bunter sandstones, in order to obtain a fresh supply of water for the town, the contractor, Mr. Richardson, has called upon the Town Council to assist in the extra expense occasioned by this influx into the well, which is now about 800ft. in depth. The Council refuse to recognise any liability; and on Tuesday it was agreed to refer the point to Mr. Bramwell, C.E., for arbitration.

At a meeting held at Dawlish on Monday, plans for a new cottage hospital, prepared by Mr. Bridgman, architect, of Torquay, were approved, and it was decided to erect the hospital in Stockton-road. The new building will contain on the basement an out-patients' room, committee-room, kitchen, and offices; on the first floor, male ward, female ward, lavatories, bath-room, operating-room, and matron's room; and above this three bedrooms. The total cost of erection and furnishing is estimated at £760 only.

On Friday morning the Mayor of Southampton, with seven members of the Town Council of that borough, and Mr. James Lemon, C.E., their consulting engineer, visited the sewage works at Taunton. The working of the system was explained, and a demonstration given of the process adopted for dealing with the sewage. The Southampton Corporation intend constructing sewage works, and desire to see how other towns have succeeded.

An inquiry was held last week, at Dover, before Mr. Terry, from the Local Government Board, respecting an application from the corporation for sanction to borrow £650 for sewerage purposes. The inspector said Mr. Rawlinson suggested that there should be a layer of concrete over the top of the sewers as a protector, and that if the town council required any additional sum for the extra work, they would be at liberty to ask for another £50. The borough surveyor accepted the suggestion.

The Royal Unity Lodge, M.U. Odd Fellows, Launceston, have decided to erect a new hall in the Western-road from plans prepared by Mr. C. P. Wise, of that town. They have accepted the tender of Mr. William Burt, also of Launceston, and the work is to be carried out forthwith.

Our Office Table.

THE Sub-Committee of the Sanitary Institute of Great Britain appointed to test the Cows exhibited at Leamington, having carried out an elaborate series of experiments, have arrived at results of great value. These, however, show the necessity of further investigating the whole subject of ventilation by automatic means. It is therefore proposed to extend the inquiry to other appliances for ventilation besides those already submitted to trial. By permission of the Kew Committee of the Royal Society the experiments will be carried out at the Royal Observatory, Kew. The Council have passed a resolution appointing Captain Douglas Galton, C.B., F.R.S., Rogers Field, B.A., M. Inst. C.E., and W. Eassie, C.E., as a committee to undertake such investigation with a view to the publication of the detailed results. The expense of the contemplated inquiry will be considerable, and the Sanitary Institute have not at the present time funds available for this purpose. It is therefore proposed to raise the requisite fund by special subscription among those interested in the thorough investigation of the subject.

On Wednesday evening, the 12th inst., the Liverpool Engineering Society held its usual fortnightly meeting. Mr. Thomas Duncanson read a lengthy paper on "Storing Water," which treated of the construction of large storage reservoirs. The author commenced by stating the principles on which the yield and capacity of reservoirs are determined, showing the most economical proportions between the two factors, then went on to consider the actual construction of reservoirs, the usual practice of hydraulic engineers being fully described, special reference being made to the Yarrow reservoir of the Liverpool Corporation, and concluded by pointing out the necessity for some national scheme for utilising the mountain or rainy districts of England and Wales for the supply of towns. The paper was well illustrated by diagrams and tabulated statements.

MR. SEYMOUR HADEN, whose gifts as a practical etcher are well known, is about to deliver at the Royal Institution a course of three lectures upon the theory and practice of the art. The lecturer will give a certain novel interest to his discourses by the introduction of practical illustrations of the various processes of engraving. In his first lecture he will deal exclusively with the value of etching as an unrivalled mode of expressing certain kinds of artistic truth, dwelling at the same time upon the need of its encouragement by bodies like the Royal Academy, which at present gives no kind of instruction in etching. In his second lecture, Mr. Haden proposes to etch a plate before his audience, in order to show them how the needle, by removing the ground from the copper, permits the acid to bite out the incised line from which the impression is afterwards taken; and in his third lecture he will have a copperplate press by his side, and illustrate by practical experiment the manner in which the printing is performed.

A PAPER was read last week at the Society of Arts by Mr. William Thomson, F.R.S.E., F.C.S., "On the Injurious Effects of the Air of Large Towns on Animal and Vegetable Life, and on Methods Proposed for Securing Salubrious Air." A great variety of chemical facts and valuable statistics were brought forward, mainly on the authority of Dr. Angus Smith, to show that not only is the air of our large towns much contaminated, but that these contaminations are very injurious to the health, happiness, and longevity of the people who breathe it. The best scheme as yet proposed for the abatement of this evil, Mr. Thomson thought, was that proposed by Mr. Peter Spence, F.C.S., of Manchester, who deemed it practicable to build a chimney 600ft. high, 140ft. external diameter at the bottom, and 100ft. internal diameter at the top, at a cost of about £10,000, thus providing for the perfect combustion of all the coal burnt in Manchester. It was understood that Mr. Spence's system, propounded more than twenty years ago, had been adopted successfully at the Manchester Assize Courts, and was to be applied to the new Law Courts in London. The first great advantage of the plan was its making the liquid and gaseous sewage to a great extent neutralise each other. Again, it would thoroughly

ventilate the sewers; and, lastly, it might materially help to solve the liquid sewage problem, as was explained in detail. The system might be cheaply extended to all our large towns by simply joining all the chimneys in each block of buildings together, and connecting them with one tall stack.

TENDERS were last week accepted by the Corporation of Leeds for the erection of a new "destructor" at Armley-road. A similar apparatus was erected about eighteen months ago at the Sanitary Depot, Burmantofts, and it is in consequence of the satisfactory result of this experiment that the Sanitary Committee of the Town Council have now determined to extend the system. The committee had much trouble and expense in disposing of the rubbish swept from the streets or emptied from ashpits. Residents objected to the refuse being "tipped" upon any vacant ground in the vicinity of their dwellings or places of business. This difficulty has, however, been solved by Mr. Fryer's patent, of which the Town Council purchased a license in May, 1877, after the system had been proved to work well in Manchester and other towns. As the patent carboniser at Burmantofts is equal to dealing with the whole of the animal or vegetable matter found among the market refuse or street sweepings, only a "destructor" will at present be built at Armley-road. The first-named apparatus comprises a furnace or kiln which converts vegetable refuse into charcoal, which is available as a deodoriser or manure, whilst the clinkers which result from the process of burning in the second case are ground up into an inoffensive powder, and this finds a ready market as mortar or for road-making purposes. When the rubbish is first collected, the fine ash found mixed with it is sifted out, and either sold separately or used as fuel in the subsequent stages of the process. Broken old pots, sardine or Australian meat tins, and other articles of metal are also picked out, cleansed by being put through the furnace, and after thus being partly fused, are sold as old iron. The remainder of the rubbish comes out of the destructor as clinkers, which are ground up in mortar pans, mixed with lime, and sold so readily that the supply at present does not meet the demand.

At a meeting of the Council of the Royal Architectural Museum, held at Westminster on Wednesday last, Mr. Joseph Clarke, F.S.A., resigned the office of senior hon. sec. to the Museum, a post which he has so ably filled for more than twenty-five years. The office also of treasurer, held by Mr. Clarke since the death of Sir Gilbert Scott, was also declared vacant. Mr. Clarke's resignation was received by the council with much regret, and the president, Mr. Beresford-Hope, M.P., explained that nothing but advancing years, and consequent pressure of domestic ties, had induced Mr. Clarke to tender his long-since-talked-of resignation, which was accepted with so much regret by all. Mr. John P. Seddon was unanimously elected in Mr. Clarke's place, to act as hon. sec. conjointly with Mr. Maurice B. Adams, and Mr. Walter Cocks was elected treasurer by acclamation. The reports of the classes and school of art, as well as of the sketching club, were read, and bore witness to the considerable improvement in the quantity and quality of work done; while, in connection with the club, it was announced that an endeavour is being made to arrange some Saturday afternoon sketching excursions during the summer months, Mr. Adams having consented to accompany the excursionists. The books selected by Mr. A. J. Pennington, the recipient of the five-guinea prize last year in connection with the club, were inscribed by the president, and Sir Walter James promised a similar prize of equal value this year. Messrs. Ewan Christian, J. P. St. Aubyn, Professor Lewis, Sir Walter James, and Mr. J. P. Seddon promised to attend in turn the meetings of the club held this session, on the first Wednesday in every month. The club now numbers about 40 members.

In these days of "Chippendale Chairs" and "Eastlake Tables," when "over-mantels" enrich our fireplaces, and blue plates the walls of our sitting-rooms, anything fresh in the way of furniture worthy of consideration, both from an art, as well as from a common-sense, everyday point of view, would, perhaps, seem scarcely possible. We have had Greek and Mediæval furniture, then Anglo-Japanese and Queen Anne, while the useful "Bentwood"

furniture is but a recent introduction. In spite of all these things, we are about to possess another "latest thing out," and really, judging from the specimens which we have just seen, the ingenious and useful "chair furniture" to which we refer, invented by Mr. J. Taylor the architect, of Westgate-on-Sea, will be welcomed by very many, at any rate for partial, if not for the entire, furnishing of their houses. The idea, like most good ones, is "the simplest thing in the world." One or two pieces of furniture, such as a chair and table, with a ledge or two, and a whole suite of furniture, can in a few moments be obtained. Thus, two chairs and a ledge, if we may so term it, and you have a bed on the same two chairs; two box-like cupboards, with another sort of ledge, and not only a useful, but in every way suitable, buffet or sideboard for a dining-room; and so on, with an almost endless variety of combinations, the whole series of individual pieces being at once in readiness for removal in the smallest possible time and space. For officers and others whose residence in one place must always be more or less of a temporary character, such furniture would be a considerable advantage, and although few people would perhaps care to make their houses into a sort of wizard's cabinet, yet most families have apartments in their houses known as "spare rooms," where convertible furniture such as Mr. Taylor's "chair system" would be most suitable. We hope soon to publish a series of examples of Mr. Taylor's invention, when our readers will be able to judge for themselves.

MR. WILLIAM HAYWOOD has made a report to the Street Committee of the Commissioners of Sewers upon the electric lighting experiment at the Viaduct. Beyond the details peculiar to the site selected the report is of no value whatever, and will not help to the solution of the problem whether the electric light can be economically applied in the illumination of streets. It appears from Mr. Haywood's report that the Jablochkoff system is "about $7\frac{1}{2}$ times as dear as gas-lighting," but the 16 electric lamps employed gave "about seven times more light than the 16 gas-burners." If illuminating power is made the basis of comparison the two lights are, therefore, practically equal; but, unfortunately, no photometric tests appear to have been made, and in estimating the lighting power of the Jablochkoff candles Mr. Haywood has taken the unsupported statement of the Société Générale as the basis of his calculation. Hence his report must be taken for what it is worth, and that is merely a proof that the electric arrangements cost $7\frac{1}{2}$ times more than the gas.

THE Society for the Protection of Ancient Buildings has been too hasty. The Dean of Norwich has been carrying out extensive works of reparation at Norwich Cathedral, including substantial repairs to the west front and the removal of the modern yellow wash from parts of the interior; these operations being executed in great measure at Dean Goulburn's cost, and under the supervision of the architect to the dean and chapter. In the course of the work of cleaning, a few square feet of decorative colouring were revealed on one of the arches at the east end, and have been left as a memorial to future generations. Some officious person unacquainted with the facts of the case, presumed that the old fresco thus uncovered was but the commencement of a scheme of colour decoration to be extended over the whole cathedral. Such an opportunity for advertising the Anti-Restoration Society was not to be neglected; the official machinery was set to work, and at once the honorary secretary wrote a sharp letter to Dean Goulburn protesting against the application of colour to the cathedral. The amusing point of the misconception is, that so far from the internal walls of Norwich Cathedral being in danger of deprivation of "the tender grey tints of age" with which they are invested in Mr. Morris's eyes, they are covered from plinth to vaulting boss with a hideously dirty yellow wash, spread over the entire surface in Dean Turner's time, some seventy years ago; this it is intended to remove, and so render visible the divisions of the stones in the Norman, and later work. A smart rap on the knuckles for the mistaken zeal displayed in his "very able if not modest dissertation" was given Mr. Morris at the meeting of the Norfolk and Norwich Archeological Society on Monday, and the Society has gained little by its precipitate interference.

THE Westminster and Pimlico Industrial Exhibition for the current session, is to be held

in a structure which is being built for the purpose, upon an admirable site lent by the governors of the Greycoat Hospital, in Westminster. This is between the Victoria Chambers and the Army and Navy Stores, on the south side of the street, opposite to the block of the "Members' Buildings." Mr. Seddon, who is vice-chairman of the committee, is acting as honorary architect; and has arranged four buildings, each 70ft. long by 20ft. wide, and 12ft. high to the eaves, around a quadrangular court 70ft. square. The buildings are being erected by Mr. Humphreys, of the Borough-road, upon his system of corrugated iron. The internal court will be covered with prepared canvas, tent fashion, but in three aisles, the central one 30ft. wide, and the side ones 20ft. It is expected that additional annexes will be required, as the applications for space are numerous. The exhibition is to be of workmen's handicraft, arranged in the following classes:—(1) Mechanical, (2) artistic, (3) general, (4) fabrics and fancy work, (5) work of children in elementary schools, and (6) of young persons under 18. The exhibition having been certified by the Board of Trade, the patent rights of all exhibitors will be protected.

THE Committee of the Central Association of Master Builders of London, in presenting their Report, congratulate the association on the successful termination of the "masons' strike" last spring, when the "Masons' Union," although it did not withdraw its demands, allowed its members, under certain conditions, to return to their work. The association is now entirely free from debt. Although it has only been in existence ten years, it has successfully resisted two most important strikes, besides doing other useful work. During the past year the association has joined the "National Association of Master Builders of Great Britain." In view of the recent struggle, and of the circumstance that the building trade of London has barely recovered from its effects, the committee would not at this time suggest any reduction in wages, but thinks some modification of the hours of labour might be advantageous.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of fevers, biliousness, small-pox, skin diseases, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 118, Holborn Hill. Use no substitute. —[ADVT.]

ROOFING SLATES.

Reduction in Prices.

Send for price list to THOMAS R. ROBERTS, Slate Merchant, Conway, before ordering elsewhere. Slate slabs, eills, hearthstones, ridges, cisterns, and all other kind of slate work very cheap. —[ADVT.]

CHIPS.

The Free Library, Bradford, and also the Liberal Club in that town, have been ventilated with Messrs. Robert Boyle and Sons' patent self-acting air-pump ventilators, and we understand the result is satisfactory.

The gaol at Dorchester is about to be enlarged at a cost of £30,000. The work is to be done by convict labour, and Mr. G. Crocker, of Dorchester, has been commissioned to furnish the materials at schedule prices.

A memorial stained-glass window to the late Col. Coles has been placed in the Cowper and Coles aisle of Hastings Parish Church. The subject is Peter preaching to Cornelius.

Alterations and additions are about to be made to the Medical Schools, Cambridge, to accommodate students of human anatomy, and the Syndicate have approved Messrs. Tompkins and Sons' plans for the same.

Mr. J. P. St. Aubyn has been appointed as architect for the restoration of the fine Late Perpendicular Church of Gamlingay, Cambridgeshire, which is now in a state of great dilapidation.

New Government offices are being erected in King-street, Cardigan. The contract is being carried out by Mr. D. M. Williams, of that town.

The Norfolk and Norwich Hospital Committee have accepted the tender of Messrs. Lacey, of that city, at £44,450, for the erection of the two western blocks and the administration and operation departments of the reconstructed hospital. The work is to be commenced as early as possible.

The restoration of St. Mary's Church, Bungay, is about to be carried out from the designs of Mr. R. M. Phipson, of Norwich and Ipswich. The first contract, that for the restoration of the tower, has been taken by Mr. H. Nurser, of Bungay.

The Lancashire county magistrates have appointed Mr. W. H. Stevenson foreman of works at Whittingham Asylum. There were 115 candidates for the situation.

THE BUILDING NEWS.

LONDON, FRIDAY, MARCH 28, 1879.

DECORATION AND ARCHITECTURE.

WHILE the decorator and architect are so estranged from each other as they almost necessarily are under the present art regime, it is vain to expect from the former an acquaintance with certain principles of art that underlie what we may here for our present purpose call architectonic decoration. The absence of this knowledge, or rather concern for the architect's work, is painfully made apparent in almost every building in which the highest class of art decoration is not attempted. Panels in tints, borderings and stencilled patterns, scrolls and festoons arranged in a kind of rococo manner appear to be the stock-in-trade of the school of decorators we have now in view. Something must be said, indeed, for the latest fashion for dull and dingy colours. If rather sombre for our climate, they are sensible; our wall-hangings, carpets, curtains, wear well in them, and they do not lend themselves to that light and frivolous kind of decoration to be found in the saloons and cafés of Paris, and which under the term of "Louis Quinze" is even now extolled by some decorators as the acme of refined elegance. Such ornament we have long since relegated to theatres and music-halls, though even in the better examples of such places it is giving place to something less tawdry and superficial. In many of our recent restaurants and hotels the taste for borders, scrolls, &c., appears to be reviving—whenever, in fact, the money to be spent in decoration is insignificant in proportion to the extent of surface to be covered. Not a few recent buildings, including an hotel on a grand scale, threaten to call into requisition this kind of artistic trimming. The walls and ceilings must be covered with something, and the "scroll and panel" style—if we do so designate it—is the cheapest and most effective. Now it appears to us to be a great pity something less mechanical could not be substituted for this stereotyped kind of ornamentation, if only a ceiling or a room could be artistically treated. We do not suggest that a piecemeal plan be adopted, as a picture in fresco or mosaic undertaken in one part, leaving the other portions cold and bare. This plan, we know, is a favourite one with some artists; it is fragmentary, and always unsatisfactory. It is better to avoid pictorial wall-painting altogether, than to begin a scheme of subject-painting with but slight chance of completing it. A less uncertain mode of treatment is that of partial relief by flat retiring tints, or the use of coloured materials. In this kind of decoration everything depends on the harmony of the tints. Friezes, dados, spandrels of arches, and ceilings, naturally lend themselves to this mode of decoration, and it is rather to be regretted that architects have not encouraged the use of coloured stucco more than they have. Frescoes are admitted to assimilate better with architecture than oil-painting, despite the failures that have occurred in its employment in England; its very deficiency of depth and richness of colour, and the absence of glossiness, are unquestionably points rather in its favour than otherwise. Elaborately-finished oil-paintings, such as Delaroche's "Hemicycle," in the Ecole or Musée Beaux Arts, Paris, is quite beyond the province of architectural decoration—the cost about £30 a square yard, if we are to accept the figure from a well-known authority, being

equally beyond the reach of most people. The frescoes at Westminster are really a series of panel or easel pictures, and are pronounced by all competent judges to exceed the limits of decorative painting. If we would regain a true taste for decorative art that should be applied to architecture, and yet subordinate to it, we must go to Egyptian and Greek art for models. In both instances the idea of decoration was relief, flat, conventional ornament, or scenes from heroic or religious mythology. Even Greek sculpture was eminently decorative. The art of the 12th century and the Renaissance was also mainly decorative. It strove to preserve the graceful and pleasing in form and colour, and the attributes of realistic or "high art," as it is sometimes called, were always absent. If we seek to discover the rôle which painting played in the great historic periods of architecture, we shall find it following the architectural forms and subservient to them. The patterns from Egyptian ceilings given by Sir Gardner Wilkinson show a thorough knowledge of decorative combination in colours. The ceiling-patterns of the tombs were arranged in compartments, in which the favourite forms of the lotus, the square, circle, diamond, fret, scroll, and zigzag occur, and these were painted upon the stucco. The borders were plain lines or other devices in red, blue, or green. The shafts of the columns were covered with painted stucco. Red, blue, and green were predominant colours, but yellow and black are also seen, and these were used with a knowledge of the value of complementary juxtaposition or harmony. It is well known the paint was mixed with water and a little gum. The Greeks and Etrurians employed coloured decorations with equal, if not greater, delicacy; red and blue were used for grounds, and the celebrated frieze containing the Panathenaic procession, which encircled the peristyle internally, had a blue ground. In the mosaics of Hadrian's Villa at Pompeii, in St. Mark's at Venice, and the beautiful processional compositions found in the Ravenna churches, St. Apollinare Nuovo, especially, there is much to be learnt. "Legitimate mosaic decoration," says an able authority, "like all true architectural decoration, should, in the first place, be made subservient to the architecture." The subjects chosen ought to be simple in design and gradation of colour, while anything approaching pictorial effect should be avoided; the treatment should be broad, and a happy mean between the baldness of the earlier and the florid tendency of the later works taken as a guide. In the friezes, vaults, pendentives, and domes of buildings, mosaic decoration appears to be most happily introduced, as the imperfections of the method become less visible. For walls and pavements mosaic is equally suitable as a coloured incrustation; it becomes, as observed, to the structure it decorates, "bone of its bone," and, by virtue of its intimate connection and durable character, is more desirable as an architectural decoration than either fresco, encaustic, or water-glass. One great advantage in the use of mosaic is the facility with which soot and smoke can be removed by simple washing. Water-glass painting, too, so largely used in Munich, is a great rival of fresco, though its merits have been impugned of late. In this process a soluble alkaline silicate is used as a medium between the colour and substratum. Our object here, however, is to suggest decorative principles rather than technical processes.

Of monumental painting M. Viollet-le-Duc, in his "Dictionnaire Raisonné," speaks with considerable critical acumen. He says: "Harmony in subject painting is always regulated by essentially decorative principles; it changes in quality of tone, but it always remains equally applicable to subject

or ornament. In the 12th century it was absolutely similar to that of Greek painting; backgrounds were kept light, figures and ornaments were put in with full local colour, instead of with what we call demi-tint; reliefs were light, almost white, in their salient parts; modelling was carried out in brown for every tint alike; finishing touches, in light colour upon the dark and sombre parts, and in dark colour upon the light parts, corrected any spottiness in the ensemble. Colours were always broken on broad, light surfaces; gold was used in brilliant parts, such as embroidery and the nimbus of a saint, but rarely as a background." He then proceeds to notice the leading colours, such as yellow ochre, light red, greens, and secondary tints, such as rose-purple, and observes that a brown line divided adjacent colours. In the following century the primaries began to dominate. We do not instance mediæval colouring as in all cases worthy of imitation; but we merely desire to point out that in the purest periods the decorative character was uppermost in the mind of the artist, and that, as art degenerated, the picture became the idea rather than the wall or ceiling. One very fundamental distinction is necessary to be observed, and that is decorative painting is not easel painting: each has its distinct qualities and province. We may here notice some very judicious remarks made by M. Veron upon this point. He says, "Easel painting always seeks more or less to deceive the eye, its aim is to produce the effect of relief upon a flat surface." Again, it must be executed with the intention of being viewed from some one point, but in monumental painting of the best epochs unity of point of view is never attempted. In pictures painted on walls at all elevations, the painter never took account of horizon or effects of perspective, but boldly painted his figures in attitudes proper to the positions. If a horizontal line were assumed there would be only one point of sight, and so soon as the spectator moved from this point the perspective of the whole picture would become false, "all the vanishing lines begin to dance and to give a feeling of sea-sickness to people who viewed them." As the same writer remarks, the system adopted was based on a reasoned-out principle; "it condemns the whole scheme of decoration of a room to appear true to one person alone—he who happens to occupy the right point of view." "What are we to say of that so-called system of decoration which places flat painted ornaments side by side with scenes in which truth of effect, of light and shadow, and of perspective is aimed at? Representations in which reality of appearance is produced by the use of relief are altogether out of concord with flat ornamentation." Monumental painting, therefore, whether it depicts scenes or otherwise, has to deal with plain surfaces, and harmony, not crude colour, nor illusion, should be the aim of the artist who endeavours to unite painting and architecture.

ARTISAN REPORTS ON THE PARIS EXHIBITION.

IT was not by any means a novel idea on the part of the Society of Arts, or of the Royal Commissioners, even of the workmen themselves that a selected body of "Artisan Delegates" should be despatched to the Exhibition at Paris last year, to make their observations upon the various works of industry and more especially the trades which they represented, and to give us the results of their visit in the shape of "Artizan Reports." The experiment has been tried at most of the great Exhibitions, with more or less success, and though the neat pamphlet which presents us with the record of the doings and experiences of the Liverpool Working Men is free from some of the graver faults which have characterised former

productions of this kind, it is almost impossible to escape from the conviction that the gain will be to the men who went to Paris, and not to their brother workmen who may or may not read their reports.

We learn from the introduction that Mr. Forwood, then Mayor of Liverpool, received last year a circular from His Royal Highness the Prince of Wales proposing that steps should be taken to send some skilled workmen to Paris, to see the Exhibition, and report upon the trades they followed. As a consequence of the action inaugurated by the Mayor, subscriptions were received to a considerable amount; and ten men started for Paris—or, at any rate, this number sent in reports. They were:—A bookbinder, a boot and shoemaker, a bread-maker and confectioner, a cabinet-maker, a cooper, a pattern-maker; a gilder, a letterpress-printer, a ropemaker, and a general reporter, who treats of the excursion, and rambles over various topics, from Sanitation to the Electric Light. The General Report leads the van, and describes the hearty welcome which the Liverpool party received from Sir Philip Cunliffe Owen and the many ways in which the genial Secretary of the Royal Commissioners attended to their comforts; for which, by the bye, we find he was presented with a copy of a "resolution drawn up and approved by the men," thanking him and his staff for their many acts of courtesy and kindness. It is not necessary that we should do more than glance at the various reports which follow: we find from the introduction that "each Artisan was requested to devote at least seven days (inclusive of travelling) to an inspection of the Exhibition, and of the manufacturing establishments in the City of Paris, where the special work in which he was interested was carried on." This latter instruction was no doubt excellent in theory, but must have been rather difficult in practice. Indeed, but for the exertions of Sir P. Cunliffe Owen, it would be next to an impossibility for a stranger, of the Artisan class, to obtain admittance to the workshops of a foreign country. We are surprised to find in how many cases our Liverpool friends did, however, actually see the methods pursued in French workshops, and thus obtained an insight into the details of the manufactures, whose results only could be seen in the Exhibition building.

The reports vary greatly in length and completeness; the power of observation rarely goes hand-in-hand with the facility of recording what one has seen; certainly not in the artisan classes of this country. A man may be a first-rate craftsman, but totally unable to tell his fellow workmen the details of the processes in which he is skilled, or to analyse the causes of success and failure in a trade with which he is familiar. It is this defect which is most conspicuous in all the artisan reports which have come under our notice, the want which is so apparent in all of them of a ready power of description. The best report from the Liverpool men is undoubtedly that of the boot and shoemaker, Mr. John Garvey, and nearly equal to it in merit are those of the printer, Mr. Swainson; the cooper, Mr. McStay; and the cabinet-maker, Mr. James. There is in all the reports a strong tendency to stick up for old England, and to preach the doctrine that we have little to fear from foreign competition, or, as the preface neatly puts it, "It will be observed that the reporters generally unite in the testimony that the products of British artisans compare upon the whole favourably with those of other countries." Some reporters put this truism more forcibly. Thus the ropemaker winds up his brief report, "In conclusion, I saw nothing to alter the opinion that has hitherto been held as to Liverpool by foreigners, viz., that we

make the best rope that can be bought in the world. We have, therefore, I think, nothing to fear in the rope-making business from foreign competition." There is no mincing of the matter here, and several of the other delegates are equally confident that we can "lick all creation."

ARCHITECTURAL MOSAIC.

II.—MEDLEVAL MOSAIC.

THE Ancient Mosaic, as we have said, decayed with the decay of the Roman Empire. But the art had left vigorous roots which, under Christian auspices, started into fresh life, and developed new forms and styles, when the arts were again free to enter upon a renewed career. But yet during the period of decadence (say from 220 A.D., onwards) we may trace the existence of two distinct schools, which were connected by so slight a link with the ancient that Dr. Kugler is "almost tempted to believe that historical mosaic painting of the grander style first started into life in the course of the fourth century." These two schools or styles may be distinguished as 1st, The Later Roman; 2nd, The Byzantine. The Later Roman flourished chiefly in Italy, during the fifth and sixth centuries, and decayed during the mediæval troubles of Italy, about the middle of the ninth century. It employed coloured glass tesserae in common with the Byzantine school, but its distinguishing feature was that the design was worked out nearly always on a ground of blue or white. The finest specimens of this style are the churches of Santa Maria Maggiore at Rome, and St. Vitale at Ravenna. The Byzantine style differed from it chiefly in the constant employment of a gold ground for the design. It originated with the artists who doubtless accompanied Constantine from Rome upon the removal of the seat of empire to Constantinople (Byzantium) and who added to the traditions of ancient work, which they carried away with them, many ideas of magnificence and gorgeousness derived from the Oriental taste of their new land. The most glorious specimen of Byzantine mosaic is the Church—now the Mosque—of St. Sophia at Constantinople, built by the great Emperor Justinian upon the close of his Persian campaigns, towards the middle of the sixth century, and adorned with all the spoils of the East. These splendid mosaics are not at present visible, having, where the Turkish conquerors have found it impossible to destroy them without injuring the fabric, been long hidden under thick layers of fanatical Mahometan whitewash. In the year 1848, however, when the Mosque was under repair and the whitewash was temporarily removed, the late Sultan permitted them to be examined, and magnificent drawings of them were made, which were published by M. Salzenberg in a large folio volume, through the liberality of the then Prussian Government. From a technical point of view, these mosaics are remarkable among other things for the presence among them of silver mosaic, the actual existence of which was for a long time very doubtful, although recipes for its manufacture are found in MSS. of artistic processes of the seventh or eighth centuries. They are found in the great groined vaults of one of the galleries of St. Sophia, and their position is worth notice. This vault is constructionally a groin as far as the middle portion, where it becomes a flattish dome, and the artist has cleverly given the idea of its being a groin to a certain extent, by following the intersecting line of the vault with his decorative lines, and then has indicated its termination in a dome form, by the introduction of a central circular ornament; and in this part some of the silver ground mosaic is introduced.

Another interesting technical feature of the mosaics of St. Sophia was observed by M. Salzenberg, by aid of the scaffolding used for the repairs, viz.:—That when the mosaics can only be seen from beneath at an angle exceeding 45 degrees, the pieces are arranged with their upper edges set forward from the wall face in tiers, farther and farther apart, as the angle of vision is increased. By this means the work is saved on much intervening space, and both material and cost economised, in some parts to the extent of two-thirds of the whole. This method also had the advantage of reflecting the light at a better angle to the eye. The pieces of glass usually employed in Byzantine work were of irregular shapes and sizes, and of all colours and tones of colours, and very seldom indeed without gold ground. The execution was always large and coarse and very rarely approached even the "Opus Majus Vermiculatum" in neatness of joint or regularity of bedding, and yet in general effect of gorgeous, luxurious, and yet solemn decoration, they are unapproachable. They often produce even an effect of sublimity, which is due chiefly to the great simplicity of the forms and draperies, and the severely majestic, or grandiose, expression always given to the swarthy visages of the saints and heavenly beings who were their chief subjects. The style, however, was conventional and monotonous in the extreme, and true, natural art under its exclusive influence was impossible. But for many years it was the only pictorial art which was practised or has survived to our day, and it is to Byzantine mosaic we are indebted for the preservation of much of the symbolism, and many details of the ritual, and even of the theology, of the Christians of those early periods. It prevailed extensively all over the East, and at last came back to Italy, influencing all the architecture of that country and its neighbours for at least a thousand years. The Later Roman style having decayed, the Byzantine—or Greek, as they were now called—workmen came into Italy in the early part of the fifth century, and for a period of six hundred years were the principal—nay the exclusive—workers in mosaic everywhere. A chronological list of buildings decorated by them in this interval is given by Lord Lindsay in his "Sketches of the History of Christian Art." In the year 1073 the decoration of St. Mark's, Venice, with mosaics was begun by the "Greek" artists and was continued by them till the 14th century. Their work is estimated to cover a space of 30,000 square feet of the upper wall, vaulted roofs, and cupolas, and are on a gold ground. The mosaics of this building are the grandest and most extensive in the world, being executed by successive artists through several centuries; and form a perfect cyclopædia of the history of the art. For in addition to the work of the Byzantines, they were continued by the Italian artists down to the 16th century, designs being furnished by the greatest artists of the day such as Titian, Tintoretto, Salviati, Sansovino and others. In range of subject the mosaics of St. Mark's have been styled by Mr. Ruskin "the poor man's Bible," and he adds, "a glorious Bible." All the wealth of Venice was expended during six centuries in putting these works together; and in 1610 the Senate of Venice decreed that no ancient mosaic should be removed, whatever its merits or demerits; but where it was in danger of ruin, the design should be carefully copied and the work restored to its original state.

In the middle of the 13th century, the Italians, led by Andrea Tafi, a painter of Florence, emancipated themselves from Greek tutelage in mosaic, and it is remarkable, as Vasari points out, to observe how rapidly Tafi improved when working on his own responsibility at the Church of S. Giovanni, Florence, after having induced a Greek workman of St. Mark's, Venice, to teach him

the details of the art. It appears that his method of working was to mark the cartoon with red outlines on the stucco, and set his squares very deeply into it firmly cementing them also to each other. He had not, however, taken sufficient care to guard against the penetration of damp to the back of his work—one of the most fatal enemies to mosaic—and this defect was afterwards effectually cured by Agnolo Gaddi, who employed as a hydrofuge stucco made of mastic and wax, which has proved effectual to the present day. Among the contemporaries and successors of Andrea Tafi were Jacopo da Turrita, the Gaddi, Giotto and others, and under their influence the art became Italian, and no longer exclusively Greek. The works of these artists forms the third and best style of mediæval, or Christian, mosaic, which for convenience has been called the Romanesque. This style, while still remaining many traditions of the Byzantine school upon which it was founded, is distinguished by greater freedom in the designs, due to the employment of the most eminent artists of the period. Many of the later mosaics of St. Mark's are by artists of this school, but it finds its most complete illustration in the decorations of the dome of St. Peter's at Rome, which were begun by Clement VIII. at the commencement of the 17th century. The decoration of this church, in fact, exercised as great an influence on the progress and development of the Romanesque school as that of St. Mark's had upon the Byzantine. When it was begun, mosaic workers in Rome were scarce, and they were paid at the high rate of four scudi per square palm for coarse mosaic; but this rate of pay soon attracted such an influx of workmen that the price was soon brought down to half a scudo, equal to about half-a-crown of English money. Natural causes operated very much in promoting the cultivation of mosaic in Rome, for the humidity of St. Peter's proved so destructive to oil paintings, that it was found advisable, even in the time of Urban VIII. to substitute mosaic. The study of the art was also stimulated by the constant discovery of fresh ancient examples, and also by the genius and skill of the artists, among whom may be named Muziani, Paolo Rossetti, Marcello Provenza, the Fabio family,—who copied in mosaic some of the works of the great painters, Domenichino, Guercino, and Carlo Maratta,—and Giovanni B. Callandra who died A.D. 1644 and executed the well-known copy of Guido's picture of Michael the Archangel, in one of the chapels of St. Peter's. Callandra also invented a retarding mastic cement, which removed the greatest difficulty in the way of the old methods of fixing the tesserae, enabling the artist to improve and correct his work as he proceeded, and thereby conferred the greatest benefit upon the art. No improvement or change of any importance has taken place since his time until the modern revival. There were, however, two kinds of mosaic, common to all the above styles or schools of mediæval art, namely, (1st) Opus Grecanicum, and (2nd) Opus Alexandrinum. Opus Grecanicum was mainly a system of glass tessellation, executed in grooves cut in white marble to about half an inch in depth. It was generally employed as an inlay in church furniture, shrines, screens, tabernacles, altars, monuments, &c. The patterns were always of the geometrical kind and often very elaborate, the ornamental bands being customarily combined with large slabs of the most precious materials, serpentine, porphyry, pavonazzetto, &c. It was only occasionally used as an adjunct to architecture. The floor of the chapel and the shrine of Edward the Confessor in Westminster Abbey were executed in this kind of work by Italian artists in the time of Henry III. The finest Italian examples are in the cloisters of St. Paul's, the church of St. John

Lateran, the porticos of St. Lorenzo fuori de Mura, Rome, and the Duomo at Civita Castellana. Opus Alexandrinum, which was sometimes called also Opus Grecanicum, was chiefly work in marble tessellation, executed in grooves like that just above described. It formed the ordinary Italian church paving from the period of Constantine down to the 13th century. The patterns were nearly always geometrical, and very much resemble one another throughout Italy and Sicily. It is not usually finished with such great neatness as the Opus Grecanicum. Having lately given in this journal a full description of this style with an account of some fine specimens to be found in England, we will now merely refer the reader to that article.

Opus Alexandrinum work was discovered almost entirely towards the end of the 13th century, being gradually superseded by Florentine Mosaic, which was formed by slices of marble arranged somewhat like the ancient Opus Sectile, that is, with the projections of one piece fitting into the recess of another. It was in this way used at first for conventional patterns and in monochrome only, but afterwards also for pictorial representations. Its progressive development may be traced from the Church of San Miniato and the baptistry at Florence, though the works of Giotto at the Campanile, Brunelleschi at the Duomo, and Orcagna at Or San Michele, to the singular pavement at Siena, where through the wonderful skill of Beccafumi, large, elaborate compositions may be seen, admirably exhibited in light, half-tint, and shadow, by means of the three marbles only. Another kind of mediæval work is known as Volcanic Mosaic. This bears some analogy with the early Florentine, but differs in the materials, which, as the name indicates, are of volcanic origin. It was developed in Naples, Sicily, and Auvergne, where nature affords an abundant supply of the materials. It was used for external decoration, and was remarkable for the depth and contrast of its tints.

ARCHITECTURAL GEOLOGY.—VI. OLD RED SANDSTONE AND DEVONIAN.

THESE two series of rocks are considered by some geologists to belong to one and the same geological period, since they both are found immediately underlying the carboniferous strata which we described in our last article; and there is no doubt that they have many characteristics in common, and from the character of the fossils which we find in them it is probable that some of their beds were formed at the same epoch in the earth's history. From the fact, however, that the Old Red Sandstone is for the most part a freshwater deposit which has been formed in lakes of vast extent, while the rocks of the series termed Devonian are chiefly of marine origin, it has generally been concluded to regard them as separate formations.

The Old Red Sandstone, with the investigation of which the name of Hugh Miller is chiefly associated, is largely developed in several parts of Scotland, which it stretches across in a diagonal direction in three great belts; the southern zone extends from Haddingtonshire into Berwick, skirting the Vale of Tweed, and passing through Roxburgh, Dumfries, and Kirkcudbright. The central zone extends along the east coast from Stonehaven down to Dundee, and along the Tay Valley, westward to Stirling and Callander, fringing the Frith of Clyde as far as Ardrossan. In the northern parts of Scotland it is found, covering a considerable area in Banff, Moray, Ross, and Cromarty, where it juts out into the Moray Frith on both sides, and skirting the north-east coast is developed into lofty prominences at the northern extremity of Caithness. This formation yields a large amount of material

which is useful for building purposes, as flags for paving, limestone for burning into lime, and an unlimited amount of building stone, the products varying according to locality; white, yellow, and sometimes red sandstones being obtained in Fife and Moray and the southern counties; red sandstones and limestone in Perth, Forfar, Kincardine, and Fife; with paving flags in Forfar, and micaceous sandstones in Caithness.

In the South of Scotland good sandstone for building purposes is found in Dumfries, at Eccles and Thornhill; and the red stone quarried at Corsehill, near Annan, on the Solway Firth, has recently been introduced into London as a building material; white and red freestone is obtained in Roxburgh, at Denholm, Hawick, and Jedburgh. In Berwick good building stone is obtained at Coldstream, Churnside, Dumse, Greenlane, and Paxton; and in Haddington at Garwald and Prestonkirk. In Lanark we obtain white, brown, and yellow sandstone at Broomhill, Lanark, Lesmahogow, and Wilsaw, some of which is much used as a building stone in Glasgow and the vicinity. In Ayr a limestone is found at Dalry, brown freestone at Ardrossan and Dalnellington, and a white freestone near Kilwinning. In central Scotland there are numerous quarries in Perth, at Aberfeldy, Auchterarder, Blackford, Blairgowrie, Cupar Angus, Crieff, Errol, Mylnfield, &c., the stone from which is largely used in the local buildings. In Forfar the red colour prevails in the sandstones which are quarried at Arbroath, Brechin, Dundee, Forfar, and Kirrymuir, some of which is employed for buildings in London. There are also quarries of building stone at Stonehaven and Kirkside in Kincardine. In the North the red sandstone is worked for building at Cromarty, Dingwall, Inverness, Munloch, and Tain, near Ruthven, Spynie, Auldearn, and Nairn. In Caithness it is quarried for flagstones in the neighbourhood of Thurso.

In England and Wales the Old Red Sandstone is found covering a more limited area than in Scotland, being chiefly developed in parts of Salop, Gloucester, Hereford, Monmouth, Brecon, Glamorgan, Caernarthen, and Pembroke, where its strata attain a considerable thickness, varying from 4,000 to 10,000 feet. In the upper beds are found red and variegated sandstones; in the middle marly sandstones and flags, with beds of concretionary limestones, called "cornstones"; and in the lower part pale-coloured sandstones and marly beds, with cornstones. In Gloucester the grey sandstone quarried at Lydney was used in building Tortworth Court, the seat of Earl Ducie, and also the Cardiff and Newport docks; that from Coleford is much used for buildings in Gloucester and Bristol; grey building-stone is also quarried at Tortworth and Newnham, and a white stone near Charfield. Herefordshire contains many quarries of the Old Red Sandstone, which is largely developed in that county, building-stone being procured in the neighbourhood of Bromyard, Hereford, Leominster, Kington, Pembridge, Ross, Weobley, and on the borders of Worcestershire, near Malvern. The stone obtained at Chepstow, in Monmouth, was employed in building the Abbey of Tintern; and about Newport is found a red sandstone suited to building purposes.

Devonian is the name given to a series of slaty rocks, grits, sandstones, and limestones, which is chiefly developed over a large portion of North and South Devon and in parts of West Somerset and Cornwall, and in its upper strata closely resembles the Old Red Sandstone. In the northern parts of Devon it covers a large tract of country, extending from Baggy Point on the extreme west to Wiveliscombe in Somerset, while in the south it occupies most of the country bordering on the sea from Dartmouth

east to Plymouth, and over a large portion of Cornwall, from Mount's Bay in the south-west to Tintagel in the north. In the neighbourhood of Barnstaple and Dulverton we find beds of calcareous sandstone, grey slates, and nodular bands of limestone. Beds of red and grey sandstone occur along the north coast about Trentishoe; calcareous slates, with bands of limestone, extending from Ilfracombe to Withycombe and the Quantock Hills in Somerset; while grey and purple slate is quarried at Morteheo on the north-west coast, at Challacombe, and near to Wiveliscombe in Somerset. Beds of hard red and grey sandstone, with slate, are found in the neighbourhood of Dunster, Minehead, Porlock, and Linton. Black and white marbles are obtained from quarries in the neighbourhood of Bridestow, South Tawton, Drewsteigton, Chudley, and Staver-ton. In the south of Devon this formation contains large quantities of limestone in the neighbourhood of Ashburton, Bury Pome-roy, Chudleigh, Ipplepen, Newton Abbot, St. Mary Church, Plymouth, and Torquay, from which are obtained excellent marbles, together with stone for building and paving purposes. Marbles of various shades of grey, with white and yellow veins, and occasionally red marbles, are procured near Plymouth, Pitit Tor, St. Mary Church, Babbacombe and Newton Bushell. At Ipplepen, near Totness, a handsome red marble is obtained in blocks of considerable size; and at Kitley Park the marbles are green and rose-coloured. The chief slate quarries are at Newton Abbott, South Molton, Tavistock, and Totness; slates are also obtained from the quarries in Somerset, about Wiveliscombe and Wellington, which also yield flags and building-stones. In Cornwall the formation is chiefly remarkable for the excellent quality of the slates obtained from it, the best being quarried at Delabole, near Camelford, Tintagel, Liskeard, Callington, Linkinghorn, Mawgan, Bodmin, and Wadebridge; from some of which places good paving stones are also procured.

SILURIAN AND CAMBRIAN ROCKS.

These rocks, which are considered by geologists to be the oldest of the fossiliferous formations, derive their names from the localities in which they are most largely developed in this country; the Silurian being found in large portion of Wales and the English counties bordering thereon, a part of the kingdom formerly occupied by the tribe of ancient Britons known as "Silures," over whom Caractacus reigned as king, who is well-known in history for the brave stand he made against the Roman legions. The Cambrian rocks, which form the base of the Silurian, and were formerly looked upon as belonging to them, but are now separated into a distinct group, are chiefly developed in the north-west of Wales, small patches only being found in other parts of the Principality. The chief characteristic and most valuable product of all these rocks is the slate, which they yield in large quantities, suitable for use as slabs, or for roofing purposes, the quality of this slate being superior to that obtained from any other formation. The slate of these formations is generally termed by geologists "clay slate," to distinguish it from the thin sandstone flags which are found in the coal-measures, and are often used for roofing purposes; clay slate consisting chiefly of clay which has been subjected to enormous pressure, both horizontally and vertically, whereby it has been completely metamorphosed, and a new stratification called "cleavage" introduced, which is often at right angles to the plane to which the beds were originally deposited. It is by means of this cleavage that the quarryman is enabled to split the slate to any required gauge of thickness merely by the use of a hammer and chisel. The action of heat has also destroyed all trace of any

fossils which the clay originally contained. The principal slate quarries of Wales are those in the neighbourhood of Bangor, Conway, Tremadoc, Ffestiniog, Llangollen, Portmadoc, Dolgelly, Barmouth, Montgomery, Denbigh, Llangodog, and Aberystwith.

In the North of England these rocks are developed in Cumberland, Westmoreland, and the adjacent parts of Lancashire, where large quantities of greenish coloured slate is quarried about Ulverstone, Coniston, Cockermouth, Hesketh, Newmarket, Ambleside, Keswick, Windermere, Broughton-in-Furness, Whitehaven, Burnside, Langdale, and Kirby Lonsdale. Flags and building stones are also obtained from most of these quarries.

In the West of England the Silurian rocks are found in the counties of Stafford, Worcester, Gloucester, Salop, Hereford, and Monmouth; sandstone and limestone being procured from them near Dudley, Abberley, Malvern, Walsall, Bilston, and Sedgely. Near Hereford the Woolhope limestone is quarried for building purposes; at Ledbury, Aynestry, and Donnington, an hydraulic cement is made from the limestone, and a good building material obtained from the sandstone; at Downton Castle, in the North of Hereford, a micaceous sandstone is quarried. Limestone and sandstone are obtained at Mayhill in Gloucester, sandstone and flags at Dymock. In Monmouth the flags and limestones are quarried for building purposes in the neighbourhood of Usk, and at Knighton and Presteign, in Radnorshire.

The Silurian rocks of Scotland are less calcareous than those of England and Wales, and consist of a fine-grained clay slate of an inferior quality, together with coarse granular sandstone. This formation ranges across the Southern counties of Scotland, from St. Abbs Head on the east coast, through Berwick, Roxburgh, Peebles, Selkirk, Dumfries, Ayr, and Kirkcudbright, as far as the Mull of Galloway on the West; forming the Southern Highlands and the ranges of the Lammermuir and Pentland hills. In the north we find a thin band along the south-eastern borders of the Grampians, and in Argyre, Ross, and Sutherland. It also occurs in parts of Forfar, Kincairdine, Aberdeen, Banff, Elgin, and Caithness.

The chief slate quarries are those of Ballachulish, in the north of Argyre, near the entrance of the Caledonian Canal. There are also slate quarries in Perth about Glenshee, Criff, Tullybeagles, Benledi, and at Birnam and Dalbeattie, near Dunkeld. Those of Abercainry and Aberfoyle yield sandstone for building as well as slates for roofing. In Forfar slates are obtained at Dundee and Forfar, and limestone at Brechin and Hedderwick. In Aberdeen there are slate quarries at Aboyne, Gartley, and Tronp-hill, and in Banff we find limestone at Keith, Fordyce, and Cullen.

The Cambrian rocks yield the purple slates of the Penrhyn quarries in North Wales, and those in the locality of Llanberis pass; also the slates of Ffestiniog which are shipped at Portmadoc, and those of Machynlleth, Aberdovey, Llangollen, and Barry Island. The quarries of Llanfair and Dorothea west yield green, blue, and red slates; those near Barmouth, purple and green slates, with a sandstone suitable for building. Good building stone and flags are also quarried from the Cambrian rocks about Ffestiniog. At St. David's and Ramsay Island this formation yields different coloured slates, with flags and sandstone for building. In England patches of Cambrian rocks are found at the Longmynd hills and in the neighbourhood of Shrewsbury, where green and purple slate and grit-stone is quarried; and at Charwood Forest, Barrow-in-Soar, and Bardon in Leicester, roofing slates are procured from it. The

Hollybush sandstone, which is quarried near Malvern for building purposes, is considered as belonging to the Cambrian formation.

The rocks of the Silurian formation are of marine origin, and appear to have been deposited in shallow seas, as many of the limestones are formed of old coral reefs.

MR. SEYMOUR HADEN ON ETCHING.—I.

THE first of a course of three lectures on Etching was given by Mr. F. Seymour Haden, F.R.C.S., at the Royal Institution. The lecture was illustrated by a series of etchings by the old masters, shown upon screens. The admirers of the art of etching ought, the lecturer thought, to have a desire to share with others the pleasures which had recently been a sealed book to almost all. He had himself long enjoyed the impulse of raising an art that had been lost, and he wished to have the opportunity of explaining something, that needed explaining, and of putting right what seemed to him to be wrong; those were the incentives, and he trusted would be accepted by his hearers as excuses for his appearance before them that day. It was, perhaps, surprising, that as a man belonging to a scientific profession he should have addressed himself to the elucidation of a scientific point without bringing to bear on it the prejudices which belong to professional habits and modes of thought. A member of his, or, indeed, of any profession, was not under influences conducive to movement of mind, except in the usual groove and by the customary routine, with the necessary result of a limitation of view. It was his wish to look over the sides of the groove of the etching world, and to assist his audience at the same time to understand the origin and *raison d'être* of the art. He referred those wishing to go more fully into the subject than would be possible in three lectures, limited to an hour each, to procure a little book he had written, "Notes about Etching," published by the Fine Arts Society. It was his belief that the art faculty was innate; that it could not be acquired—like the moral and intellectual forces, it might be cultivated if already present in the mind, but could not be created. At the same time this art-faculty might be debased as easily as it might be improved, by wrong examples and teaching. Upon this subject of education by example and precept, he considered that what was called an academical school was bad in its influence upon art. He believed that an academy—any academy—which was established, ostensibly, at all events, for the purpose of subserving the highest objects of art, in reality had no other effect than to cause one artist to resemble another. An academy, like any other guild, was very beneficial to the interests of the artists, but not to those of art. Nor would he attach any greater value to what was called technical superiority, nor to traditional manner than to academical training. Further, minute rendering in artistic work was bad. Elaboration of detail required time in execution, whereas a work of art presupposed an active conception in the mind of the worker as quickly developed. A picture which had taken a year to prepare would probably be a very poor work. The great masters believed that the fire of genius burned very quickly, and acted accordingly. He would not go into what constituted a good drawing, as he had done that in the little book already referred to. All fine art was suggestive, and not imitative; realistic work was thoroughly bad and foreign to the instincts of art. A good drawing was not an exact representation of the object sought to be pictured to the mind; but a collection of lines so laid down as to suggest the object and to give the impression of the great force which it had in nature. If a man could do the latter he could draw; if not, however carefully he might follow the rules laid down in schools, he could not draw. No painter undertook to reproduce the morning mist, for example, but merely to suggest it; the sculptor did not select marble to represent human flesh because of any analogy or resemblance between the substances, but because the material carved allowed of the utmost delicacy of form in portraying the human outlines, while possessing a purity of tone with which flesh could not compare. Amongst artists, the dreamer who wished to express his high conceptions in the tersest manner, employed the point as the tool with which to write; the etcher's needle possessed an in-

eisiveness of character which was shared by no other instrument or process. This thought brought them to the main object of the discourse, the restoration of the etching to its proper place in art, that place which it once occupied, but in which it no longer stood. How was that to be attained? He thought its restoration might be accomplished by a better understanding, both inside and outside the art, as to what painters' etching really was. The first thing was to explain what it was (a thing he thought very few understood), both in theory and practice. The former he would undertake that day, and the latter in the two succeeding lectures. In the first place, he must treat upon the theory and history of the art, and why it was practised. In the second place, he should consider the cause which had displaced etching from its proper position, a cause which he should show was still in operation to prevent its general practice, and in the third place, he would indicate the mode in which that deterrent cause might be got rid of. In the first place, therefore, the history of engraving told us that it was by origin a painter's, and not an engraver's art. The early painters engraved their own works, resorting of course to the use of tools for the purpose, in the hope of making their works more widely known, and so of increasing their artistic fame. There were originally no copyist engravers, nor were there even when the work passed into an art of delving in the copper-plate without lead. Engravers proper did not appear till the depression of art in the period of the Commonwealth. After the death of Charles I., art was stamped out; all the King's pictures were sold, and dispersed over the Continent, and high art disappeared in England quite suddenly. If they took the whole period of engraving on copper, from its development in the fifteenth century to its decline in the nineteenth century, it would be found that it consisted almost entirely of works executed by the burin and graver, and that it might be easily divided into two classes—that of the painter or artist, and that of the copyist. From the moment that it became possible to produce engraved work by the point of the pencil, the burin fell from the hands of the former and higher class of workers, and artists devoted themselves to original etching, while those who still used the burin became mere imitators. It was evident, therefore, that there could, in the nature of things, be no personal antagonism or rivalry between the two classes of engravers and etchers. Notwithstanding the higher character of etching, the etcher was excluded from the ranks of Royal Academicians, while engravers were admitted to equal membership with painters, sculptors, and architects. This action on the part of the Academy constituted a tacit indictment of the etcher, which it was the duty of the etcher to plead to and answer if he could. The reason the old masters etched was simply to extend their reputation, and because, fortunately for art, there were no engravers to do it for them. There was an impression current that etching was not good in which you could see between the lines, and that such an etching had a gridiron effect. But true art consisted in producing the greatest effect with the least effort, and the best artist was he who used the fewest lines to convey his meaning. The works of the best etchers, as could be seen on the screen, contradicted this theory. The right number and character of lines were those in which the artist could best express his own thoughts and peculiar temperament. The art of etching was purely a suggestive one; if this were not the case, it would be realism, and not art; the more detailed the work was in its details, the more opaque and uninteresting was it likely to be. For all that, the doctrine of elaboration was that maintained by the Etching Club. That it was mistaken might be seen from the examples of Rembrandt's etchings exhibited on the screen; the brilliant appearance of the first-proof of one of his works with the effect of the second when it had been touched up was very noteworthy. But he must pass on to the second, and by far the most important, part of the subject, and that was to consider the causes which had been in operation to displace the originality of etching from its proper rank in art, and which were still in existence to prevent its rehabilitation. The period of this debasement of etching might be considered to extend from the establishment of the Commonwealth to the present moment. The low state of art at the former time favoured the

introduction of the copyist engraver, and that agent had, in our own days, enrolled as a co-worker, the dealer in pictures. The present low state of art depended, and was due, almost entirely to the combination of the engraver and the dealer. The way in which the engraver came upon the scene was this. One could imagine him going to the painter, let them say, for example, Vandyke, and saying to him, "What is the use of your doing etchings? There is no art here now, the king is dead, all the great patrons and masters are fled; there is none left who cares for art. What is the use of your etched plates? Nobody understands them, and as for the idea you contemplate in 'Icones,' of portraying a hundred of the most eminent and foremost men, spare yourself the labour and let me do it for you. True, my work is not exactly like yours, but it will be quite good enough for these times." Vandyke, we know, yielded to these arguments; the "Icones" was completed by mere engravers, and thus the art of etching was lost—killed by the same blow that chopped off the head of King Charles. The lecturer showed on the screen the forceful and beautiful character of some of the heads in the "Icones," as etched by Vandyke, notably that of the Earl of Pembroke, and the mode in which they were elaborated and spoiled when the engraver touched them. The work of the etcher fell presently into the hands of Woollett and Sharp and that class of engravers, and subsequently, into a still greater type of workmen, the mezzotinters, many of whose works were so good in their way, that people almost forgot that they were not original. About that time, Hogarth and Turner conceived the idea of engraving their own works. Hogarth could not stand the manner in which his works were engraved, and it was to that determination to become his own engraver that we owe the pleasure which all felt in looking at Hogarth's works. Turner followed the example, and if time had allowed he would have become a great engraver. He etched all his works himself, and in many cases also mezzotinted them. Nothing was more interesting than to examine his work; the little faults and improvements he found in the proofs showed how difficult he found it to be satisfied with the mezzotinters. In face of the fact that three of the greatest artists and etchers, Rembrandt, Hogarth, and Turner, all etched for themselves, because dissatisfied with the engraver's work, it was unnecessary to urge the superiority of etching over engraving. If this were the feeling of artists in the best days of engraving, how much greater must be the difference now that engraving was really bad? The operations of the modern dealer were very characteristic, and directly inimical to the development of etching. The *modus operandi* of the dealer—the ideal representative of that class—was wonderfully clever. He posed himself as the sole medium of negotiation between the *nouveaux riches* of no refinement, but who must follow the prevalent fashion, and the artist; he was shrewd and businesslike, and determined to speculate in art. He, therefore, went to the painter, and asked him the price of his picture. "£500." "Very well, you may raise it to £1,000 on this condition—that you only sell it through me." Then the dealer saw the *nouveau riche*, and told him he must have a picture by So-and-so, and that he would procure one for him at about £1,500. But the dealer operated on a very much larger scale than that by means of the great "steel plate." The dealer went to a different sort of artist, and said, "I must have a picture, one of a kind that will impress the greatest number of people—it had better, therefore, be religious. In order to invest the work with the greater reality, you must go to the East, and you must be away about three years painting it, and after you bring it home we will exhibit the work all over the country. We will engrave it, and take off thousands of impressions from a steel-plate, everyone of which we must call 'proofs.' Now, we will have, say, perhaps, a thousand impressions, all 'proofs before letters,' another thousand 'proofs after letters,' some artist's proofs, proofs on indigo and other paper, at ten, eight, six, and five guineas each, to suit the credulity and pockets of those who have to pay for them, although, as you know, there is not the least difference between the several proofs." The whole transaction between artist, dealer, and engraver would thus reduce itself into a very serious conspiracy. The dealer sought to make himself sole arbiter between the

purshaser of pictures and the artist, and to be the sole judge of art. With these 20,000 or 30,000 issues of "proofs" of steel engravings one might compare the forty or fifty impressions of etched plates. The dealers' influence and power was immensely augmented by the action of the Printers' Association. That was an organisation established for the express purpose of stamping every one of these so-called "proofs" as proofs on payment of a certain fee for each copy, and the stamping of the Association was regarded as evidence that such impressions were proofs. The Association took to itself immense credit for its operations. It would stamp as many proofs as a member liked to take, if he paid the fee, and the purchaser could afterwards point to this stamp upon his copy as proof that it was a proof. It was evident that etching had the utmost difficulty in making a stand against such a custom. It had been proposed to call the present time the Iron Age or the Steam Age, but, in his opinion, a more distinctive name would be that of the "Steel-Plate Age." There was yet another cause for the decline of etching, which it was extremely awkward for him to touch upon, and yet he must do it, as he was there to speak the whole truth. One of the reasons for the non-revival of etching was, undoubtedly, the character of the work executed by the amateur etcher. For twenty years past it had been supposed that anybody could etch, and some very bad work had been done by the amateurs, so bad that the Royal Academy had made it an excuse for the thorough exclusion of etching from its walls. For this he did not blame the Academy so much as the amateurs. The art itself could not, however, be held responsible for the bad work issued under its name. He was extremely sorry for the bad work he had done himself. He should not publish any more etchings; he would advise amateurs generally not to prepare any more, and then the Academy would have no pretext for refusing to admit etchings. He had no ill feeling against the Academy; very many of its members he knew, and respected them as personalities; but the mischief they did in their corporate capacity was immense. For a quarter of a century they had not elected an etcher amongst them, and yet there was one man who ought years ago to have been an Academician—he referred to Samuel Palmer. His etchings were carried as far as it was possible for such works; they were, indeed, much too elaborate for his own taste, but the Etching Club swore by them as the best ever produced; yet the Academy had never recognised him, while they had elected engravers as members. But he must proceed to his third point: the remedy for the debasement and neglect of painters' etching. This lay with the Academy, who ought to exert themselves to revive the art. They might do that very easily—in the first place, by encouraging its use amongst themselves. By so doing there would at once be an end of the amateur, who very naturally was hateful to the Academician. If only educated painters would etch, Mr. Haden declared he would himself etch no more, and he believed every other amateur etcher would come to the same conclusion. He thought it would also be a good thing for the Academy to exhibit the works of the Etching Club—a body which certainly did nothing, or scarcely anything, for etching as an art, and which consisted entirely of Academicians. Then they ought to give etchings a proper place on their walls, and not hang pell-mell those admitted, as was now the case. Why should not etchings have as good and distinct a place as paintings, architectural works, or sculpture? The Academy might arrange for a winter exhibition of etchings in a similar manner to that of the Old Masters—which, by the way, was entirely owing to the suggestion of the Burlington Fine Arts Club. That exhibition came about in this way. When the British Institution of Painters broke up (for want of funds, so it was said), the Burlington Fine Arts Club of Connoisseurs endeavoured to carry on the winter exhibitions of the Institution, and negotiations were opened with the Academy for the use of their galleries for the purpose of showing works by the Old Masters during the six months those rooms were previously closed. The proposal was accepted by the Council of the Academy, and Sir Francis Grant met the Burlington Club and arranged everything. When the scheme came before the general body of members they refused to confirm the arrangement, and it fell through. The club

then called on the Academy to carry out a similar plan themselves, and this had been done. Returning to the remedies for the present condition of etching, he might add there was one more important thing the Academy might yet do, namely, to elect into their body some original etchers, and if they asked him where to begin, he would point to Samuel Palmer. By recognising etchers as artists the Academy would be doing something towards restoring and revivifying this interesting and beautiful art.

MEDIEVAL PARIS.*

(Continued from page 297.)

ON the summit of the hill on the south side of the City of Paris, Clovis, the first king of the Franks, on his conversion to Christianity, founded a basilica dedicated to the Apostles SS. Peter and Paul. Clotilda completed it, and Clovis was here interred. St. Geneviève, the patron saint of Paris, was here interred, and, from the miracles done at her tomb in the ninth century, the church received her name instead of its former one. But that church has entirely disappeared. The Rue Clovis passes over the exact site of the church, but the tower, which was on the south side, has escaped. In the second court of the Ecole des Beaux Arts are preserved the capitals of the columns of the nave. It stood in the immediate proximity of the parish church of St. Etienne de Mont. It possessed a nave with aisles, no transepts, an apsidal choir with radiating chapels, the most eastern being square; it was almost entirely rebuilt in the thirteenth century, but the capitals of the nave before referred to are evidently earlier. The nave and aisles seem to have been covered with one roof. Of the Abbey buildings large portions still exist. Worked into the modern Lycée the three courts still exist—the chapter house and refectory are comparatively perfect. The church was proposed to have been removed in Louis XV.'s time, when the enormous new church of St. Geneviève was built a little to the west of the old, which is sometimes called the Pantheon, but was not finally destroyed until about 1804. The very beautiful twelfth century effigy of Clovis, has been removed to St. Denis. The shrine of St. Geneviève, the most sumptuous in Paris, and often carried in procession round Paris to avert some threatened misfortune, was melted and broken up in 1793, but did not realise the amount expected to the Revolutionary cash-box. Of the Abbey of St. Victor, close to Halle aux Vins, no vestige now remains. It had been rebuilt in the time of François I., and must have exceeded in size and magnificence the Church of St. Eustache, which it probably resembled. Its stained glass windows were the most splendid in Paris, and its treasury rivalled St. Denis in richness. Here were preserved the hair shirt, comb, gloves, and coif of St. Thomas à Becket. In a very fine bird's-eye view of Paris preserved in the British Museum, and for the time when made singularly accurate, this noble abbey, with its spires, forms a very striking object in the south-east quarter of the left bank. The Grey Friars, or, as they are called in France, the Cordeliers, had a monastery on the south side, Rue Pascal, outside the walls. The church has been demolished, but there are remains of the buildings in the modern hospital. The Abbey of St. Antony has entirely disappeared, but has given its name to that quarter of Paris, the Faubourg St. Antoine. The best preserved of all these monastic institutions is that of the Priory of St. Martin-in-the-Fields, originally outside the walls, but afterwards included in the new extension of the city, by Charles V. It is certainly well worth a visit from all students in architecture. The church and monastic buildings are now the Museum of Arts and Trades. The refectory is used as a library, and the nave partitioned off; the choir was full of agricultural and other machines when I last saw it in October. The nave is without aisles, of immense width, with an arched timber roof and windows very high up in the walls. The choir is earlier, of a solemn Romanesque character, apsidal, of seven bays, with ambulatory and radiating chapels. This part of the church is not in the best of repair, and it is rather difficult to gain admittance, being used as store sheds. The most eastern chapel is of a

very unusual plan, reminding one something of the ace of clubs. The chief glory is the noble refectory, now used as a library; it is divided down the centre by a range of very slender columns, and has in its north wall a pulpit-like baulcon. The proportions of this building are singularly beautiful; but, like the nave of the adjoining church, has been so plentifully bedizened with colour that a great portion of its architectural interest has gone. Most of the Priory buildings remain, but have been so built in and altered that it is difficult to recognise them. The cloisters here were the most beautiful in Paris, but these, with the Lady Chapel, chapter house, and archive tower, had been rebuilt by the monks at the end of the seventeenth century. The abbey was founded by Henry I. in 1060, in honour of St. Martin. The refectory and the Lady Chapel are said to have been designed by Pierre de Montreuil. Notre Dame des Champs was a very ancient priory church, which had belonged to the Benedictines from the eighth century, but was ceded by them to the Carmelites in 1604. It was a spacious church of the twelfth century, under which extended a vast crypt. It was outside the walls in the Rue d'Enfer, and was utterly destroyed at the Revolution. The Order of Mount Carmel have since returned to the site, and fixed their abode on it. The Convent of the Jacobins was also on the south side between the gates of St. Michael and St. James. Their church was built for them by St. Louis, and, like most of the churches of this order, consisted of two parallel naves; there was one peculiarity connected with this convent—their refectory and "parlour" projected through the city wall, and formed externally, as seen from the fosse, a square embattled tower. Most of these churches of the various orders were exceedingly rich in tombs of the noble and illustrious dead; many of the effigies have been preserved, and taken to St. Denis—they formed quite a school of art of French sculpture from the twelfth to the eighteenth centuries. The Knights Templars had a splendid preceptory, rivaling the Chateau of the Louvre in its military aspect of crenellated walls and towers, and its immense central keep or donjon. After the suppression of this Order their buildings passed into the possession of the Knights of St. John of Jerusalem, as in England. Their church was like all those belonging to this Order, circular as to the nave, with a long choir. It was not equal in beauty to our London example, although it might have been larger. It was destroyed in 1805, and the last portions of this once famous edifice were removed in 1853. The Commandery of St. John of Jerusalem, now entirely demolished, was on the opposite side of the city, and was not inferior in beauty to that of the Templars. Their Church, called St. John Lateran, was close to the Hôtel de Clugny. Its barn, in two divisions, divided by columns and beautifully vaulted, was removed in 1854. The tower of the Grand Commander of the Order was in a very perfect state until then, and every effort was made to save it, but without success. Some fragments have been preserved in the Musée de Clugny.

In that small space comprised in the island of the city, not counting the Cathedral, a monastery of the Barnabites, or La Sainte Chapelle, there were no less than seventeen churches, all of which have now disappeared, only leaving very rare traces in some cases behind. The Ile de Cité was then densely populated. The streets were exceedingly narrow, and the very bridges were thronged with houses even in the Middle Ages, immensely lofty, and inhabited by many families—a characteristic of Paris to this day. Gone are the churches of St. Denis du Pas, St. Denis de la Chartre, St. Christopher, St. Geneviève des Ardents, St. Pierre aux Boufs, St. Laundry, St. Croix, St. Symphonien, St. Pierre des Arcs, St. Martial, St. Michel, Jean le Rond, St. Aignan, St. Barthélémy, St. Germain, le Ilieux, La Madeleine, and I believe quite recently what was left of the churches of the Barnabites—St. Eloy and St. Marino. The Cathedral and La Sainte Chapelle are the only existing religious edifices left on the island. St. Jean le Rond occupied a very similar position to the Cathedral, as the Church of St. Gregory to Old St. Paul's, or as St. Margret's, Westminster, does to the Abbey; it nearly touched the north-west tower. All these churches had been rebuilt in the twelfth and thirteenth centuries. Surrounded by the modern buildings of the Hotel

Dien is the very beautiful twelfth century Church of St. Julien le Pauvre, difficult now of access, as it is used as the private chapel of the hospital, but no pains should be spared by the lovers of sacred architecture to see this little gem*. Reference has been made before to the frequency of the change of dedication in Paris. The St. Julian, to whom this church is dedicated, was St. Julian the Martyr, but towards the end of the twelfth century another St. Julian the Confessor, Bishop of Mans, called from his wonderful charity St. Julian the Poor, was substituted. The nave, now of six bays, was almost rebuilt in 1675, and was then shorn of two bays at the west end to enlarge the courtyard. A chancel arch, supported on clustered columns, divides it from the choir, which is entirely, with its chapels, of the work of the twelfth century. It is apsidal in plan, with two ranges of windows in the apse, the lower richly moulded with clustered shafts, and the upper plainly splayed; the first portion of the choir is of two bays, with sexpartite vaulting in each bay. In the clerestory is a coupled lancet window, with internal columns and arches. The capitals of the cylindrical columns supporting these bays and the carving throughout is of the most masculine and vigorous type, similar in character to the choir of St. Germain des Prés and Notre Dame. In the International Exhibition last year there was illustrated a project of rebuilding the nave as it was supposed to be formerly. One has such a wholesome dread of restoration, as understood by our neighbours across the Channel, that one would prefer the process being altogether dispensed with in this case. Another large parish church is close by, St. Severin. The existing ancient churches of Paris are all very late in style; their chief glory is their old stained glass, which exists in most of them. Another point deserving of attention in them all is their clever planning; no site was too difficult or too irregular. St. Severin was almost entirely rebuilt during the fifteenth and sixteenth centuries; the three last bays of the nave at west end are earlier, and also the lower part of the tower which is at the north-west angle. When the Church of St. Pierre aux Boeufs was destroyed, one of the doorways was brought here, and now serves as the west door; the date is about the first half of the thirteenth century. The plan consists of a nave and choir of the same internal height, but externally the roof of the choir is higher, double aisles and an external range of chapels. Attempts were made to give a Classic character to the arches and columns in the reign of Henry IV.; it is vaulted throughout. The stained glass here is very fine, and deserves close attention. Opposite to the eastern façade of the Louvre is the fine church, formerly collegiate of St. Germain l'Auxerrois, not named after St. Germain of Paris, but St. Germain of Auxerre; it formerly held first rank after the cathedral, and was most richly endowed. In plan it is cruciform, but the transepts do not project beyond the double range of aisles; in length it is 240 French feet by 120 feet wide. The nave has only four bays; the choir the same, and seven in the apse. The tower at the south-east angle is the earliest part of the fabric, then follow the central portion of the west door, and the remainder dates from the fifteenth to the sixteenth centuries; but, as at St. Severin, attempts were made to alter its pointed arches and clustered columns to the fashionable style of the seventeenth century. There formerly existed in this church a very beautiful choir-screen or rood-loft, designed by Pierre Lesceot, and carved by Jean Gonjon; it was destroyed in 1744, and some of the fragments are preserved in the Louvre. There is some exquisite old glass in the rose windows and clerestory windows of the transepts. The modern glass, filling nearly all the lower windows, is of the worst description. M. Lassus was the architect employed in the general restoration which this church has undergone. The signal for the fatal massacre of St. Bartholomew was given from the belfry of it. It existed in A.D. 886, for it was pillaged and burned by the Normans. It was then called St. Germain le Rond. SS. Len and Giles, in the Rue St. Denis, is another old church of the same style—Late Flamboyant. St. Nicholas des Champs, close to the Priory of St. Martin, is curious from the mixture of styles, and is singularly imposing from its immense size and

* A paper read before the Architectural Association, on March 14, 1879, by George H. Birch, A.R.I.B.A.

* See illustrations, drawn by Mr. W. S. Weatherley, in the BUILDING NEWS of the 14th inst.

height, and is of the usual plan, without transepts. St. Laurent is similar, again. The famous architect, Lepanto, remodelled the church in the prevailing fashion of his time; but the keystones of the vault are worthy of attention. St. Mercy, in the south-east district, should be visited, for, although very late in style (it having been rebuilt in 1520 and finished in 1640), it still is in the Gothic style. It is a large cruciform church—a nave of five bays, a choir of three, and seven bays in the apse; there are two aisles on the south side of the nave, only one on the north, but both have chapels. Two architects of the name of Slodtz, in the reign of Louis XV., beautified it in the style of that age. Here the stained glass is very fine, but sadly fragmentary; a portion of one window has been removed to make good another. St. Gervais, so conspicuous an object, looking eastwards towards the Ile de Cité and the Hôtel de Ville, is an imposing structure from its height and size. St. Modard is remarkable for its continuous mouldings and curiously carved keystone. I have left the churches of St. Eustache and St. Etienne de Mont for the last, for these two churches are certainly the most beautiful of all the parish churches just described. In St. Eustache the Old Pointed style has died out, but has imparted in a most remarkable manner its characteristics of plan, arrangement, vaulting, &c., on a building which is really Classic in detail. In St. Etienne the Pointed style still prevails as far as the arches, which rest on cylindrical piers, the mouldings dying into them. The axis of the nave and choir here are not parallel. Between the nave and choir is a wonderful architectural *tour de force* in the shape of a jube or rood-loft with winding staircases, and the stained glass is the finest in Paris. Both here and at St. Eustache there is a curious arrangement of clerestorial aisles, worthy of a study to those who have to build town churches. St. Eustache is the largest church in Paris after the cathedral, and is certainly very beautiful. No interior surpasses it in dignity; debased and bad as the detail may be, yet the effect is dignified in the extreme; it is an interior which one can never forget. Some ancient mural paintings of the Renaissance have been discovered in one of the chapels; the west front is still incomplete. Passing along the Rue de Rivoli towards the city, the tower of St. Jacques de la Boucherie forms a very prominent object. The church to which this magnificent tower was attached has entirely disappeared; the plan was very irregular, it had been rebuilt in the time of François I., having been completed 1522, and was destroyed 1797, the tower being preserved for a shot tower, but the image of St. James, which terminated one of the pinnacles, was precipitated to the ground. The steeple was purchased by the city for 250,000 francs, and carefully restored, and forms as striking an object in modern Paris as it did in mediæval Paris. Behind the Hôtel de Ville formerly stood a very large and fine church, St. Jean en Greve; it had two fine western towers, one surmounted by a spire. The extension of the Hôtel de Ville now occupies this site. Of the Church of the Holy Innocents and its famous cemetery nothing now remains; it was on the west side of the Rue St. Denis. There are a number of old views of this fearful cemetery surrounded by a sort of cloister. In the centre was a pulpit something like Paul's Cross, and several stone crosses marking separate places of sepulture for communities. The upper parts of the cloisters in the roofs were used for charnel houses, and the old prints show these literally packed with bones and skulls, of which a very liberal supply lay scattered about in the inclosure. It had its fosse commune, in which coffins were stacked, only separated by a sprinkling of soil. On the walls of the cloister was painted the Dance of Death, and over the portal of the church the legend of the three dead and the three living. This cemetery of the Church of the Holy Innocents must have been a perfect Golgotha, yet the surrounding arcades, all damp and humid as they were, were filled with the stalls of linen-drappers, dressmakers, printers, and public scribes. The Church of St. Paul, near the Bastille, has entirely disappeared; St. Honoré has left a name only behind; and on the left bank St. André des Arcs, St. Benoît, St. Come, St. Etienne des Gres, and St. Marcel, have all gone.

In closing this account of the parish churches, one cannot help forming a comparison between

them and our London churches. The enormous size of these Parisian examples strike one with astonishment, but it must be remembered that mediæval Paris was very densely populated. Each house teemed with life from "cave" to "grenier," from cellar to loft. Separate dwellings for each family have always been the rule in London. Another feature is the enormous quantity of old stained glass still left in the churches. Paris never felt the fury of the iconoclasts, as did some other parts of France. The period of havoc and destruction was the end of the 18th century, and considering the fearful excesses of that time, it is surprising that Paris should still contain so much. The ancient Hôtel de Ville occupied the same position as the present; the centre portion of the west façade was then represented by three gables with traceried windows flanked by two turrets, with spires and vanes, and was supported on the ground floor by stone pillars; it was more generally known as the House of the Pillars than as the Hôtel de Ville. A great part of the ancient palace on the Ile de Cité still exists, although masked by modern buildings of the principal Law Courts of France. The chief gem of this palace was the chapel, happily still existing, and known as La Sainte Chapelle, from the extreme sanctity of the relics purchased from Baldwin, Emperor of Constantinople, by St. Louis, and here preserved. The principal relics were the Crown of Thorns and portions of the true Cross. The chapel is of two stories, for the undercroft, like that of St. Stephen's at Westminster, is level with the ground—not beneath it. It is apsidal in plan, without aisles. There are, first, four compartments, each filled with superb 4-light traceried windows and boldly-projecting buttresses; then an apse divided into seven compartments, with 2-light windows, vaulted throughout in each story, and externally surmounted by a high-pitched leaden roof and central *flèche* of carved oak and leadwork. If one would want an example of perfection in architecture of the Middle Ages we should find it here, for in this building the subtle beauties of proportion, scientific skill in construction, harmony of parts, and splendour in decoration, are as distinct witnesses of that perfection in those days as the Parthenon of the days of Pericles and Phidias. Facing the quay at the corner of the Rue de la Barillerie is the ancient Clock Tower of the palace, and continuing westward from that are several old walls and towers, especially that known as the Conciergerie, where Marie Antoinette was imprisoned prior to her death. The immense hall, called the Salle des Pas Perdus, lately burnt by the Communists, was formed within the ancient walls of the great hall. Unlike Westminster, to which it bore some resemblance in other respects, it was divided by a range of columns down the centre. At one end, corresponding to the dais, was the table of white marble where the King formerly dined, surrounded with the great vassals of the Crown; and at the other was an altar, erected by that most miserable of monarchs, Louis XI. The palace covered a very large extent of ground, and in the façade facing the Rue de la Barillerie was the parish church of St. Michael of the Palace. Close adjoining to the Sainte Chapelle was another beautiful little building, destroyed in the fire of 1610; it served as sacristies and muniment rooms.

During the Middle Ages the colleges of Paris formed a very important quarter; they have now, with the exception of the Sorbonne, nearly all gone; a few remain diverted to other uses. The names of the most famous of these colleges were those of the Sorbonne, Narbonne, Payeux, Siez, Harcourt, Bernardina, which had a particularly fine church founded by Stephen of Lexington, an Englishman; a portion of the buildings exist, used as a fire brigade station. The College of Cluny had been designed by Pierre de Montreuil, and would have vied with the finest at Oxford or Cambridge; traces remain, and some tombs are in the Musée de Cluny. The College of Beauvais preserves its chapel, a very beautiful model for a college chapel, now desecrated; there were many others of less renown. Of the Palace of St. Paul nothing remains; and of the many splendid palaces or hotels of the nobility only the Hôtel de Cluny and a portion of the Hôtel de Sens, and a fine square tower belonging to the Hôtel de Bourgogne. One of the finest of these, the Hôtel de la Trémouille, has only disappeared within these few years. The Mairie of the Fourth Arron-

dissement occupies a portion of an hotel formerly belonging to the captain of the watch. In the Hôtel de Cluny, that most perfectly preserved of all these ancient buildings, the eye rests on Roman, Gaulish, Merovingian, and Carolingian relics discovered from time to time. Antiquities of Norman and early Mediæval times are strewn around. Every age has left its mark behind; and the student in architecture and ecclesiology has no difficult task in tracing the progressive history of Paris from age to age, perhaps with regret for that which is lost, not by the decay of time, but by the violence of those paroxysms of fanatical fury which have so often disfigured the face of fair Lutetia.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The sixth meeting was held last Wednesday week, Mr. H. Syer Cuming, F.S.A. (Scot.), in the chair. It was announced by Mr. G. Wright, F.S.A., that the council had accepted the invitation of the mayor and corporation of Great Yarmouth to hold the congress of the year at that town. Visits would be paid to Burgh, Caistor, Blickling, Hail, Dunwich, and other places of interest in the locality, closing at Norwich. Mr. Loftus Brock, F.S.A., exhibited a German glass apostle cup, and several relics of old London from recent excavations, including a silver bottle which had been turned in a lathe in its fabrication. Mr. Earle Way described similar excavations in Southwark, and produced a large collection of Roman articles found in them. The Rev. S. M. Mayhew reported the discovery of some remarkable Roman remains which have just been brought to light by the new drainage works at Lincoln. Seven brick bases on pedestals were found exactly opposite the building discovered last year, and supposed to be the prætorium. He ventured to conjecture that they were for placing upon them the sacred standards of the legion quartered in the city. They were 4ft. 6in. high and 2ft. broad, and have been demolished. A good tessellated pavement has been found near the Exchequer-gate, and elsewhere traces of the ancient sewers of large size and capacity have been met with. The first paper was on "Ancient Thimbles," by the Chairman. After referring to statements made that these articles were of recent date he adduced evidence to show that they were well known to the Romans. The earliest examples, however, in this county and North Europe appear to have been of leather, one of that material being shown. It was in use in County Cork as late as 1820. A large number of examples of brass, dating from 1500, were exhibited. They were mostly found in London, and some of the 17th century have inscriptions. Several ladies who were present produced other examples of high workmanship and finish. The second paper was by the Rev. Prebendary Searth, F.S.A., read by Mr. W. de Grey Birch, F.R.S.L., and was descriptive of a Roman sepulchral inscription recently found at Bath, where several remarkable discoveries have been made in course of the drainage work.

SCHOOLS OF ART.

CAMBRIDGE.—The annual meeting and distribution of prizes in connection with this school took place on Tuesday week, under the presidency of Prof. Sidney Colvin. The report showed a slight decrease in the number of students, which was now 148. A life class had been commenced and had proved successful. In the second grade examination of fifty-four students who presented themselves, twenty-seven passed and eight obtained prizes, and in the third grade five obtained prizes and fifty-seven artisans obtained payments for the school. Mr. Beresford Hope delivered an address on the art and value of drawing.

The water supply of Preston has been seriously contaminated during its passage through open conduits near the reservoir, and the Town Council have decided to replace these by stone pipes from the Grimsargh reservoirs to Alston, at an estimated cost of £2,855.

A stained-glass window, designed and executed by Messrs. Lavers, Barrard, and Westlake, of London, has just been placed in the church of St. Peter, Battlesden. It is in the Perpendicular style, and consists of six lights, filled with scenes in the life of Our Lord.

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ILLUSTRATIONS.

THE BRISTOL UNIVERSITY COLLEGE.—WALL PAPER DECORATIONS.—SKETCHES FROM AMIENS CATHEDRAL.—VILLAS NEAR LEICESTER.

OUR LITHOGRAPHIC ILLUSTRATIONS.

UNIVERSITY COLLEGE, BRISTOL.

THE design we show in this week's number is one of two submitted by Mr. Stuart Colman, of Bristol, in a limited competition, just now decided. The council, desiring as much of the foreground as possible to be left for a future building of somewhat more expensive character, at the same time wish that the architectural character of the present building should not be neglected. The central block only, therefore, in each of Mr. Colman's designs is the part proposed by him for actual execution. In both designs the various departments, such as literature, science, engineering, physics, and chemistry, are so grouped that they are each readily reached from the central entrance. There is also ready access from the women's entrance, and from the physical and engineering group. The chemical department is behind the main building, and directly opposite the central entrance, from which it is cut off by an independent staircase. The medical school, suggested on the S.W. side, would communicate with the main buildings through an arcade or cloisters. The women's entrance and staircase is on the side farthest removed from the medical school; so that the women can enter the lecture-rooms and laboratories from their own part of the building without encountering the men; and thus an almost complete separation of the sexes is secured. In the three-story design which we publish to-day, the central entrance gives access upwards to the main ground-floor and downwards to that of the physical and engineering departments. The large lecture-room is on the left of the entrance on the main floor, and on the right are the rooms for the secretary and for male students. On the opposite side of the large lecture-room, on the terrace-level, are the women's entrance staircase and cloak-rooms, and their reading-room. The smaller lecture-rooms are on the upper floor. On the entresol-floor are grouped the principal's room, the professor's rooms, and the council chamber. The author's estimates are £11,600 for the two-story building, and £11,020 for the three-story building, fairly worked out at 6d. a footcube. We have reproduced the other design for publication as soon as space will permit, because we think it possessed of considerable originality and suggestive design.

WALL PAPER DECORATIONS.

Two or three weeks since we published a double-page plate illustrating the Gold Medal Designs by Messrs. Talbot and Crane, from the Paris

Exhibition, and to-day we give two more examples of wall-paper decorations, also manufactured by Messrs. Jeffrey and Co., of Essex-road, Islington. The wallflower design is by Mr. Walter Crane, and is intended for sitting-rooms chiefly, though it has been found suitable for staircases, or for dados to small entrance-halls, such as those on the Bedford-park Estate, where this paper is being used in this way with considerable effect. The frieze is bright in colour, and well-chosen for its position, the foliage being based upon the almond blossom, with swallows at regular intervals, giving a slight geometrical effect to an otherwise rather naturalistic design. The staircase wall-paper to the right of our lithographic plate is an attempt to solve what is rather a difficult problem in wall paper decorations, especially in cases where the staircases are of cramped proportions and quick rise. Mr. Brightwen Binyon is the author of the frieze and dado decorations here shown, the filling-in being from the design of Mr. A. F. Brophy. The dado is so arranged that while it can be used for ordinary rooms or halls, yet by simply cutting through the stem of the double panel it can be used for the rake of almost any staircase.

CARVED WOOD PANELS, AMIENS CATHEDRAL.

CONTINUING our series of sketches by members of the Royal Architectural Sketching Club, we publish to-day another sheet of pen-and-ink drawings, by Mr. T. Frederick Pennington, finished on the spot from the casts or originals in the museum. These examples are both well chosen and well drawn. The museum is particularly rich in examples of wood-carvings, both from examples at home and abroad. Members of the Club will next meet at the museum, on Wednesday, April 2nd, at 6 o'clock, when Mr. J. P. Seddon has promised to attend and look over the drawings submitted on the occasion, and the usual visitor will also be present.

VILLAS NEAR LEICESTER.

THESE two houses near Leicester were designed to combine modern requirements with the simplicity and purity of English domestic work (17th century). The cost is about £2,400. The architect is Mr. T. H. Baker, 15, Hotel-street, Leicester.

THE NEW PREMISES OF THE CHRISTIAN KNOWLEDGE SOCIETY.

WE recently alluded to some conspicuous buildings in Northumberland-avenue, and noticed their progress. One structure at the corner of the Avenue and a cross-road leading to Scotland-yard is intended for the new premises of the Christian Knowledge Society. The building in question has been roofed in and so far completed externally as to permit us to say something more definite of the design, and we take the opportunity of a visit to the building made by the Architectural Association last Saturday, of describing briefly the arrangements. The ground plot forms an elongated segment facing the Scotland-yard approach, which is curved, the main frontage being partly towards it and partly facing the Avenue, the corner of which is rounded. Mr. J. Gibson, the architect, has of course designed his principal façades to face the avenue, and this portion of the building will be used as retail shop and offices; the other end of the building being appropriated as a wholesale shop and warehouse. Entering by the main doorway in the circular corner we come to a large retail shop, forming the eastern and angular portion of the building, and lighted by large windows on both fronts. A gallery on iron cantilevers will surround this apartment, which is of lofty proportions. Passing through it on the left is a private entrance with stone staircase, with messenger's room, superintendent's office, &c., in front; behind there is a long narrow room called the "grant department." This portion of the building forms the central division of the block between the circular corner and the warehouse at the western side. The latter is a large area, rather wedge-shape in plan, devoted on the ground floor to wholesale business. It is divided by massive cast-iron pillars into bays, the floors above being of timber resting on wrought iron girders. Near the centre is a large well-hole and stairs which continues from top to bottom of the warehouse and gives access to the several superposed floors, six in all, besides the basement. The well-hole is surrounded by iron

pillars of several tiers. A lift also will traverse the warehouse floors. The solidity of the circular iron pillars strikes us in this part, but the loads on the floors will be very great. In the basement there are packing-rooms, two strong-rooms, besides urinals and lavatories for the use of the men employed in this department. We notice that the building is divided into three blocks by party-walls and iron doors, agreeably to the rule for the limitation of areas in the Metropolitan Building Act. Ascending the staircase, we reach a mezzanine floor, set apart for a tract office and accountant's room, with lavatory and w.c. On the first floor, over the retail shop, is a committee-room, a secretary's office, and a board-room, the latter being a long apartment with rounded end, lighted from the Avenue front and at end, and in communication with the secretary's offices. A circular iron staircase for private use is provided in this part. The board-room is well-lighted, but quite plain in its finishings; above are the editorial offices, the upper floors being chiefly residential. No attempt at decoration has yet been made; all the rooms are plainly finished with plaster, and are yet in a rough state. The materials used and the workmanship appear to be of the best and most durable kind; the landings and stairs are of stone (Yorkshire), and the walls of stock with gault bricks for facings. The façades are faced with Portland stone, and the quality of the mason's work is excellent in appearance. The façade is of two orders and an attic. The lower or basement order is Doric, rusticated in channels, over which is an entablature of rather unusual design. The upper members or the corona and cymatium of the cornice are omitted, there being instead a flat band-like member of very slight projection, while below this is a frieze with a guilloche ornament of convex contour. The general effect is perhaps rather flat, and sticklers for orthodox classicism will find fault probably with Mr. Gibson's innovation. The main order is a kind of Composite, and here the architect has certainly exceeded the conventional proportion for height of shaft, which looks somewhat attenuated. This order is continued round the façade, and comprises two stories. On each front the bays are arched in the attic, but in the rounded corner a straight entablature runs through; a pleasing variation is thus produced, the arched side recesses and the intercolumnar spaces in the corner being filled with windows of different design. Above the attic story is a deep-coved cornice, with trusses above the pilasters; the cove itself is carved with a diapered pattern, and a similar kind of relief is carved in the hollows of the semi-circular arched windows in the attic. In the spandrels are wreaths carved in relief. The roof is rather high-pitched, with dormer windows, pedimented, over those below. The effect of the building as we approach it from the Embankment is dignified and bold; the Palladian style of Italian adopted well disguises the parts otherwise small and unimportant, and the treatment is removed from that commonplace kind of Italian we have had so much of. It is to be regretted the columnar arrangement could not have been carried throughout the whole front, instead of the rather unpleasant break which occurs between the offices and warehouse portions of the façade, the horizontal members and windows of which latter part, we observe, do not align agreeably with the corner portion. The contractors of the building are Messrs. Cubitt and Co., who have also carried out the ironwork. Mr. Hankins has acted as foreman to the builders, and Mr. Mason as clerk of works under the architect, Mr. John Gibson.

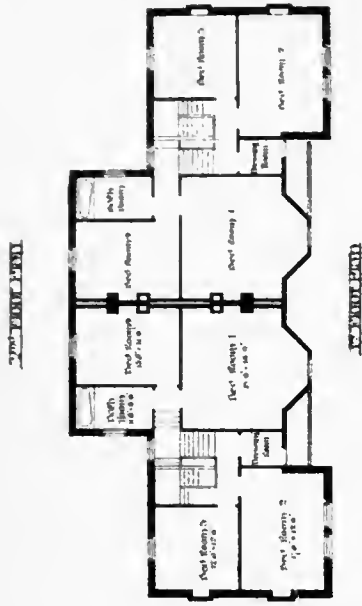
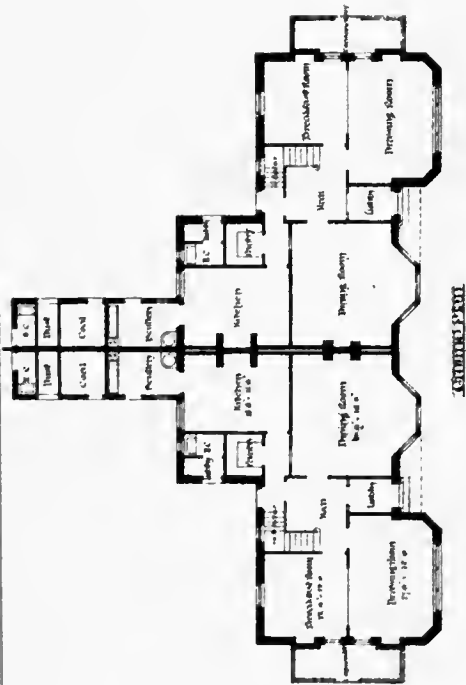
At Lambeth Police-court, on Thursday in last week, Mr. Arthur Timewell, the late proprietor of the Marble Rink, Clapham-road, was summoned by the Metropolitan Board of Works for non-compliance with a notice as to the construction of the rink. It appeared that the building was erected under a two years' licence as a temporary structure, and that it was not built in accordance with the requirements of Mr. Parsons, the district surveyor, and he had now called on the defendant either to alter it as required, or to pull it down. The point was raised, whether after a licence was granted, the rink could be regarded as "in course of erection" within the meaning of the Metropolitan Building Act, and Mr. Ellison, after consideration, held that the summons must be dismissed.

A new Wesleyan chapel has been opened at Scruton, near Bedale. It seats 75 persons, and cost £320.



THE BUILDING DEWS, MAR 28 1879.

Villas near Leicester.
T.H. Baker Arch^t.



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Scale of inches

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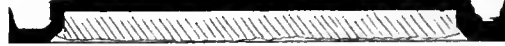
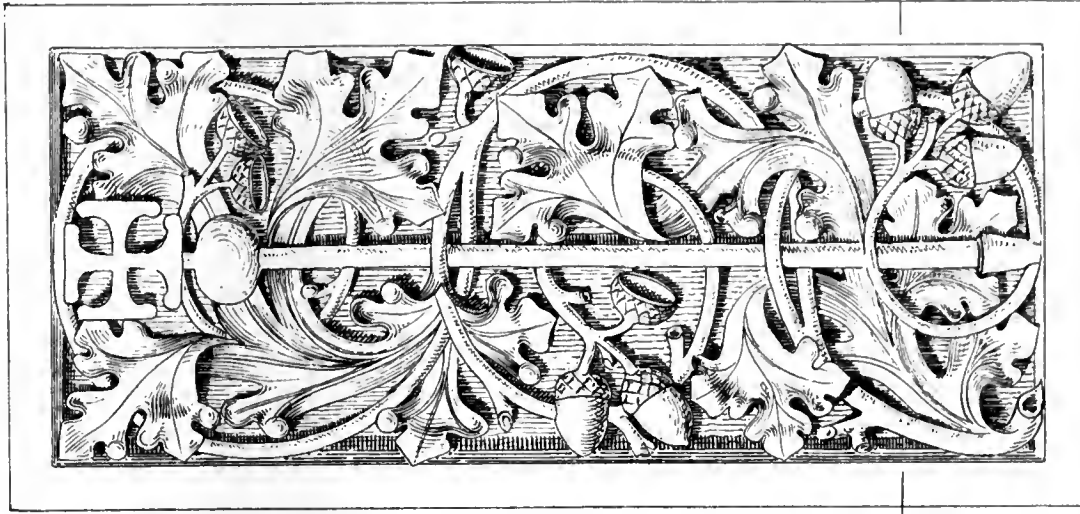
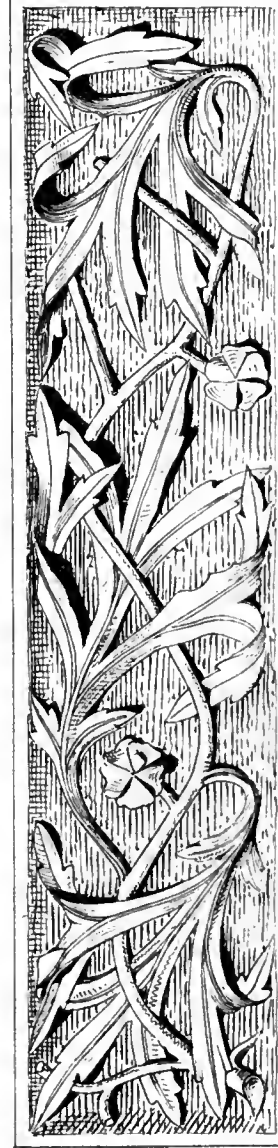
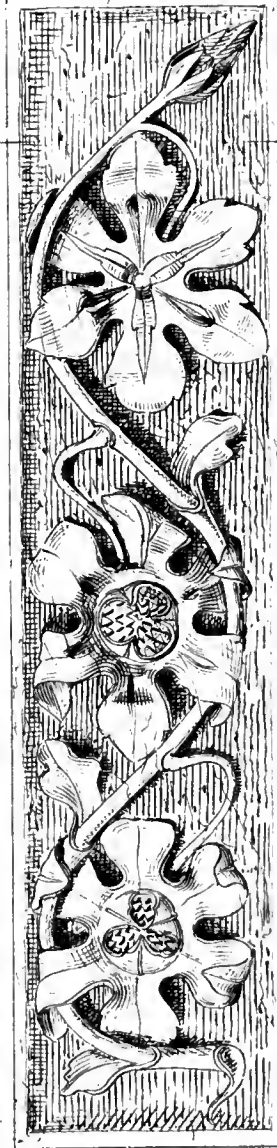
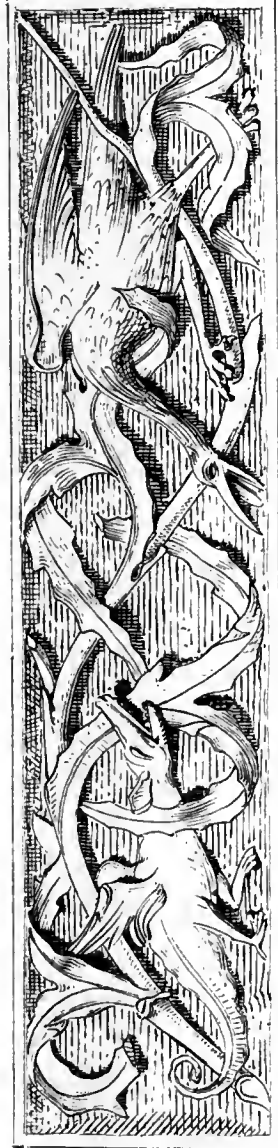
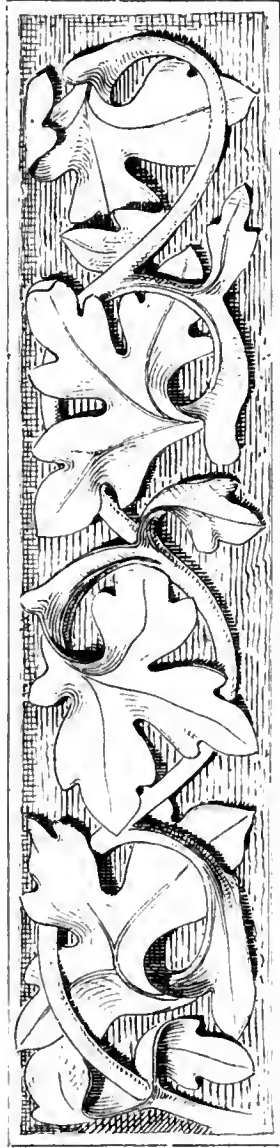
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P.A.M. SKETCHING CLUB.

AMIENS CATHEDRAL.

CARVED WOOD PANELS.

*I think Birmingham
Nov. 78.*





ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AN ordinary meeting of the Institute was held on Monday evening, the President, Mr. Charles Barry, in the chair. The following gentlemen were elected to membership:—As Fellow: William Oakley, Associate, 29, Charles-street, St. James's, S.W. As Associates: Alfred Jackson Martin, Darlington; Sydney Robert James Smith, 94, Lansdowne-road, South Lambeth, S.W.; Frederick Edward Fellows Bailey, Lichfield-street, Walsall; and Alexander Henry Kersey, 65, Moorgate-street, E.C. Prof. Martin Gropius, Government Architect, Berlin, was elected by show of hands as an honorary and corresponding member.

ARCHITECTURAL FOLIAGE.

Mr. JAMES K. COLLING read a paper on this subject. Sculptured foliage, when well and successfully engrafted upon architecture, never fails, said the author, to greatly enhance its richness and elegance. This is fully in accordance with all the most perfect developments of architecture as seen in the best works which have been handed down to us from the earliest ages, whether they are the remains left us by the Egyptians, the Greeks, the Goths, or any others. Unfortunately foliage is not unfrequently applied for ornamental purposes in the worst possible manner, but when well designed and executed upon correct principles, not overlaying the architecture itself, then it vastly improves the works to which it is added. There are, however, many cases where it is injudiciously excluded, and there has been, in times past, a tendency to substitute for it plain moulded work. In numerous instances, there is a fatal obstacle to the introduction of foliated ornamentation, because of its expense and costliness; but we not unfrequently see very elaborate attempts at decoration by the adoption of intricate moulded work, which add but little to the beauty of the building. There are other cases, still more serious, where carving and sculpture of the highest class are added in the most profuse manner, but where the money and labour are entirely thrown away, because such decoration is applied upon an improper or false principle. In all early forms of art we find plain surfaces invariably used for the development of painting or sculpture. In the Egyptian and the Assyrian, walls were made eloquent by hieroglyphics and sculpture embracing animal and vegetable forms. In the Indian, Persian, Moorsque, and the Arabian, the same principle was adopted; the buildings of these nations were literally covered with elegant combinations of foliated form, and plain moulded work is scarcely to be found. Yet all these elaborate enrichments were not added to or upon the works, but were taken out of them, and therefore they did not destroy their breadth or character. It is in Greek architecture that we first see a development of plain surface, where although friezes and pediments were enriched with matchless sculpture, still architraves, cornices and walls were left plain and bare, or were enriched only with plain moulded forms. The Greeks, however, appear soon to have disliked the appearance of many of their plain surfaces, and supplied the deficiency by painting. They then covered their plain architraves with the meander, their unsculptured mouldings with the anthemion and other ornaments, and the lacunaria of their ceilings with the star or arrangements of foliated forms. The Romans carried out the enrichment of their mouldings with sculpture to a greater extent than the Greeks, and they also enriched their friezes with many fine arrangements of foliage associated with animal form. But besides these they enriched many of their plain surfaces with sculptured foliage, as in the architraves of their entablatures, as well as the coronas and soffits of their cornices. They greatly developed and perfected the Corinthian capital, and added foliage to the Ionic capital, producing what has been called the Composite, and so considerably enhancing its beauty as an enriched capital. They panicked too, some of their pilasters with grand and magnificent foliated scroll-work. Unfortunately, however, with the exception of these last, this decoration must have been placed at too great an elevation to have been properly seen. It was left, however, to the modern Englishman to carry out these antique styles devoid of all enrichments or sculpture, except long lines of bare moulded form. He is the only artist who deliberately sits down and wastes his time over the contours of quirks and ogees, and

by the aid of the plasterer's mould runs his entablatures, and borders all his windows and doors with his surprising combinations of mouldings. His plain surfaces are relieved only by scratching upon them lines to indicate colossal blocks of stone. Happily this phase of architecture is now nearly extinct. I would, however, call your attention more particularly to the improper application of decorative sculpture. Owen Jones told us that "construction should be decorated, and that decoration should never be purposely constructed." Yet we constantly see buildings erected where the so-called decorations are added to or applied upon the architecture. Festoons and awags of gigantic size are pinned up to the surface of the walls by pateras or lions heads, and tied there by impossible ribbons, while little window pediments are broken in the centre in order that their cornices may be piled up with immense loads of sculpture or foliage. In many modern French ceilings festoons of *papier mâché* are frequently introduced, actually hanging away from the ceiling, looped up by their extremities. Surely no greater violation could be imagined than thus to separate or hang enrichment up, as if ready to fall upon the spectator's head. Unfortunately there is a precedent found in antique architecture for these applied forms. The Corinthian capital is not a composition which grows out of and forms a part of the column itself, like the grand old Egyptian capitals, but all the parts are applied or added outside the bell, which is the actual capital—a circumstance which has greatly aided the labours of the modern plaster-caster, but should not be the rule in architectural ornamentation. No period in modern English architecture is more justly noted for foliated carving than that belonging to the school of Sir Christopher Wren, at the head of which stood Grinling Gibbons. For skill in workmanship, dexterity of manipulation and close imitation of nature, this period stands higher than any other. It is, however, extremely unfortunate that so much of this remarkably beautiful carving should be afterwards applied and added to the construction. Enriched ornament, to be true, must be subservient to the purpose and to the architectural forms of the work itself. The features themselves should be enriched, and as a general rule ornament should be taken out of the material—sunk below the surface and not laid upon it. A work may in this way be literally covered with ornament which may immeasurably aid its beauty, as in the walls of the Alhambra, or the elaborately carved but simple form of an Indian sandal-wood box. The great defect of modern ornamentation is that it is so often represented as if it had weight in itself, and that it was absolutely necessary to hang it up, or that it should stand upon its own base, as in many of the otherwise very beautiful Italian arabesque pilasters. The festoon, as a means of ornamenting a work, has been used in French and Italian Renaissance more than any other form, but it is essentially a bad one, and it is at the same time one of the most objectionable forms of constructed ornament. From its very nature it is added to the thing ornamented, and is formed of an artificially constructed collection of miscellaneous flowers and fruit: It is not only made up of all manner of flowers and fruit, strung together without any cohesion of parts, but of nearly everything that can be imagined, such as musical instruments, dead birds, shell-fish, and a multitude of other objects, as well as the ever-indispensable ribbon. Grinling Gibbons appears never to have been able to get on without festoons, ribbons and drops, or pendants in his work. The example of a panel from St. Paul's Cathedral is a good specimen of this. It is executed in the usual manner that he adopted for nearly all his most important works; that is, it is carved in lime tree and planted upon an oak panel. The composition is rich and bold, but somewhat confused. In the centre there are a pair of cross trumpets tied together by a ribbon. Then there are in the upper part interlacing scrolls of a conventional type peculiar to Gibbons. Out of the upper part of the scroll there drops a swag or festoon of small flowers, either periwinkles or primroses, which runs to the upper angle of the panel, and from which, hung to a single flower, drops perpendicularly a bunch of trilobed leaves, forming the end of the design. But besides this there is a larger and bolder swag, in much higher relief than any other part, extending from the knot of the ribbon at the junction of the trumpets, sweeping to the bottom of the panel, and going right up to the extreme

angle again, from which the smaller festoon and drop hang. This is repeated in the other half of the design, all, except the scrolls, being supposed to be hung up by artificial means. The peculiarity of Gibbons' scrolls, is that instead of the leafage forming a sheath, as in nearly all Classical foliage, it grows out of the stem itself or arises from the other side of the stem. The leafage is from nature, sometimes taken evidently from the hawthorn, and in other cases from the celery-leaved crowfoot. In richer work, as at St. Paul's, the leaves are double—that is, one lapping over the other. A defect in these latter scrolls is that they grow in two directions—that is, out at both ends, which might have been easily avoided. The fruit and flowers in Gibbons' festoons are all accurately and very beautifully copied from nature, consisting of peonies, anemones, crocuses, primroses, tulips, peaches, peas, and other fruits. All are separate and disconnected, except occasionally, by some faintly carved lines or strings at the back. No part is growing but is in "still life," and all are separately fastened in their places by means of screws, nails, and glue, and where the fruit or flowers are in very high relief, they are not worked out of one solid piece of lime-tree, but are formed of different layers of wood, about two inches thick, placed one upon another. There is no undercutting, properly so called, as the whole is backed off behind, and shaped previously to its being planted on the ground, which gives the work as much relief as if it consisted of actual flowers. In a few cases all are carved out of the solid. His panels are made up in two different styles—the natural in the festoons, and the conventional as seen in the scrolls, a manner of mixing up the natural and conventional common to most of the foliated work of the Renaissance period. Natural ivy, vine, oak, and other leaves as well as fruit, are introduced among purely architectural foliage in such an incongruous manner that they never properly amalgamate with the other portions of the composition. Gibbons went in boldly for nature in his own style, and whenever he adopted the natural he made the conventional quite subservient. But in the French and Italian the natural is usually introduced as if it were only an accessory. We, in the present day, should throw aside all architectural precedents for foliage, except the principles upon which they worked, and boldly make our applications directly from nature. Instead of doing so, we are often so bound by conventional rule, that we are not likely to succeed but in a partial degree, and by adopting two different manners we must fail in harmonising them. But artists and carvers are told by architects, and one hears it continually held up as law, that foliage for architectural purposes *must* be highly conventionalised, that it must not be too natural, and so on. I was in a lately restored church the other day, and I remarked to the clergyman, "Why, what common-place designs all your new poppy-heads are." "Oh, yes," he replied, "our architect prefers them; the carver wanted to make some of them different, but the architect would not allow him to do so, but would insist upon his copying the old ones." In this manner, only too common a case, we are constantly trying to resuscitate the ornament of former ages, and the plan will bring with it nothing but disappointment. The best positions for foliage upon a building are in friezes, mouldings, string-courses, panels, and diapers. In panels and spandrels we find the greatest development for foliage. In all cases keep the most important sculptured decoration as low down as possible in a building, and do not throw away work by placing it too high to be properly seen. In the upper parts I would have ornament of a more simple character and arranged to suit the respective heights.

(To be continued.)

HOUSEHOLD SANITARY ARRANGEMENTS.—VI.

THE course of Cantor Lectures, at the Society of Arts, on "Dwelling-houses: their Sanitary Construction and Arrangements," was brought to a close on Monday evening last, when Dr. W. H. Corfield, M.A., gave the sixth and last lecture, the subject being "Water-closets, Sinks, and Baths, arrangement of Pipes, Traps, &c." The professor first explained a diagram representing the section of a ventilating man-hole, in which air was admitted at the lower part

of the sewer and passed up a ventilating pipe or shaft, of which the top was covered by a grating. A water-trap was formed by a siphon bend, and an upright piece was fitted to a plug, which would be taken off so that rods might be pushed down to clear the pipe. A man-hole is not necessary for ventilating drains; all that is necessary is an opening of sufficient size, say 6 in., directly into the drain, between the siphon trap and the house wall. The simpler form of water-closet is the Hopper Closet, consisting of a conical basin with a siphon trap at the lower part of it. Beer, Dent, and Hellyer's Artisan Closet, the pan being provided with a flushing rim, was exhibited as an example of this kind of water-closet. Water scarcely stood in the pan at all, but in the trap below. A flush-pipe should never be less than 1½ in. in diameter, and ought not to be connected with the main water-pipes. Such a connection was doubtless the cause of the epidemic of typhoid fever at Croydon in 1876-7. In the Vortex Closet the siphon was much deeper than in the Artisan, and the water stood in the basin a considerable height. The water is discharged into the middle of the basin, and there is a ventilating-pipe to take off foul air. It is advantageous to supply closets indirectly by service-boxes holding about two gallons. Specimens sent by Hayward, Tylor, and Co., and Tylor and Sons were produced. When the handle is pulled only the water in the service-box can run out, because a ball-cock is raised and the tap turned off. One service box exhibited had a provision for an after-flush, which supplied the basin with water to remain in it. Jennings' Monkey Closet had a provision by which the basin was in such a position that water must remain in it under all circumstances. Woodward's Closet is provided with a flushing rim; and Bossing's Closet supplies water by one pipe with two branches, the whole contents of the basin being washed into a vertical pipe leading into a siphon. Behind the closet is a vertical opening fitted with a cap, which can be removed if the siphon be stopped up, and there is also an overflow-pipe; but this latter the Professor considered useless. Dodd's Wash-out Closet has a provision for ventilating the soil-pipe at the place where the siphon enters it. Fowler's closets are used in poor neighbourhoods where there is an insufficient supply of water. In this system sink, rain and waste waters are collected, and made to flush the closets. A plan submitted by Messrs. Doulton was shown. The Pan Closet is most commonly used in the interior of houses, and is a mischievous contrivance. A sample was produced. The basin is placed above a metal pan, which moves in a large iron box called a container. The container has a 4 in. outlet at the lower part of it, and below the floor is a trap—generally a D-trap. The container is simply a reservoir of foul air, and a great deal of that gets into the house, as the pan does not fit airtight. This closet will in time surely go out of use. A D-trap, so called from its shape, has a pipe inside it which dips into water for a certain distance. Foul matters collect in the angles, and it can never be cleared out by the water. Such a ridiculous contrivance ought not to be used under closets. A proper trap there is a siphon trap of cast-lead, similar to model produced. A leaden tray is usually placed underneath the closet apparatus to prevent any overflow from becoming a nuisance. It is called the safe, but any other word in the language might be better applied to the contrivance. A waste-pipe is carried from the safe, generally into a D-trap, and the overflow-pipe from the cistern is generally carried into the trap of the nearest water-closet. There never should be such a direct communication between the house and the foul air in the D-trap. The waste-pipe might be carried through the wall, and made to end outside, and no trap was required. Brahmah's valve-closet as exhibited has a small airtight valve in the lower part of the basin. Overflow is provided for by holes in the side of the basin, communicating with a pipe which passes down generally into the valve box; and there is a siphon to prevent air going into the basin. Specimens sent by Tylor, Hayward and Tylor, Deer and Dent, and Boddings, were then pointed out. Jennings uses for a valve an indiarubber ball, fitting over the end of the waste pipe. Air coming in presses the ball down on to the top of the pipe that leads to the overflow pipe. Water from the overflow pipe could raise the ball and pass beyond. In Tylor's closets there is a galvanised iron siphon trap underneath; it only

requires to be attached to the closet, without any trap whatever. A cap with screws on can be taken off, and the interior got at for cleaning. Jennings has a similar closet, which is also complete in itself. A specimen of Jennings' Solid Plug Closet was shown. The plug is not solid literally, but has in it a contrivance for the overflow. It is provided with an indiarubber ring, fitting water-tight upon an aperture leading from the pan to the base of the closet. There is always water in the basin and in the siphon trap below. When the plug is lifted the water in the basin runs away and swells out the siphon below, if there is one. These closets are largely supplied without traps at all, and, if the sewers be properly ventilated, the Professor believed they would be a successful experiment. Mr. Saxon Smithies' closet is fitted with a duplex lid, which opens out behind into an air-space—a shaft carried above the roof of the house. The water supply apparatus works with the lid, and the closet is excluded from the house. Water waste-preventers were then dealt with. Amongst these were the service boxes previously spoken of. A glass cistern sent by Tylor and Sons showed a water waste-preventer inside it; when the handle is pulled the whole valve is lifted up. The lower part of the valve has an indiarubber ring, which, by pressure of the water upon it, and by force of adhesion, carries up a weight with it. Water is gradually admitted into the space above the weight, and after a time the weight falls and closes the valve. With Underhay's regulators, if the handle be pulled and released immediately, as much water will flow as if it be held up a long time. A lever works a valve, which turns off the water, and the rate at which the valve is closed depends upon the rate at which the lever can be made to fall. This is regulated by a bellows, and there is a stop-cock, which may be so placed that it will allow the lever to fall slowly, quickly, or not at all. The amount of water delivered each time the handle is pulled may be regulated with the greatest nicety. Mr. Jennings has made an ingenious improvement, in which the regulator works upon the principle of a plunger. If the handle is pulled up, and let go in the ordinary manner, the waste-preventer does not come into action; but if it is held up, after a time the plunger is no longer sustained, and the waste-preventer comes into action and turns off the water. In dealing with soil-pipes, the Professor said that they were largely made of milled or seamed lead. Those pipes gave way at the joints, in consequence of the action of sewer gas. The pipes should be of drawn lead, made in the same manner as wire, and they would then only require to be joined at the ends of their lengths. Iron soil-pipes are sometimes used, and they vary less in length than lead when subjected to extreme changes of temperature. Where expense is not objected to, the Professor thought it better to have lead pipes the whole length, and where necessary, they might be protected by square iron pipes, like rain-water pipes. Earthenware pipes are sometimes used for soil-pipes, but he considered they are not good things. An example of a zinc soil-pipe was shown, with a D-trap of very thin lead, into which the waste-pipe from the cistern was brought. The zinc pipe was quite eaten through by the foul air. Lead pipes, not ventilated, contain foul air, which eats into them. A specimen was produced, taken from under a bedroom floor, and full of holes. He did not think a D-trap underneath a closet was any good. Sinks ought to be disconnected from the drains; but if it be necessary to disconnect closet-pipes, it shows that the sewers are not properly constructed or ventilated. Sinks and baths should have pipes which are discharged over areas, upon gratings, or under gratings and over traps. It is always proper to have a trap of some kind upon a sink. A D-trap is objectionable. A bell trap in its ordinary shape is about the worst contrivance ever devised. A difference in the pressure of the air is enough to bring air from the sewer into the house; and the water into which the bell dips evaporates. In Jennings' sink trap the bell is not removable—but only a piece of perforated galvanised iron. In another variety the bell trap is hinged. Sinks up-stairs have a long pipe in which, although the pipe may be disconnected, foul air accumulates, and a trap is therefore necessary. Jennings' sink, largely used in model dwelling-houses, instead of a lot of holes, has a slit sufficiently small to prevent pieces of soap and other things going into the drain, but

it allows the water to run away easily. The aperture into the waste pipe can be stopped, and the sink used for washing. The siphon gully Mansard trap contains three compartments through which the water passes, and is useful for scullery sinks. Pipes from baths require a trap upon them and require to be disconnected. A vote of thanks to Dr. Corfield for the able and clear manner in which he had delivered his very instructive lectures was carried by acclamation.

SOME OLD HOUSES AT EXETER.

WE do not appreciate our mercies until we have lost them, is a common saying; and I realised the truth thereof very keenly when I read in a local paper of the narrow escape some quaint old houses in Exeter had recently. The publication in question narrated how, at a fire the other night in the West Quarter (the most ancient part) of Exeter, the flames nearly caught the half-dozen houses that stand upon what remains of the original old Exe Bridge. "These buildings," the report went on to say, "are the oldest in the city, and are such ramshackle, tumbledown places that their removal would be a public benefit." That was the newspaper reporter's prosaic opinion of as picturesque a group of buildings as I know! They always suggest, whenever I look at them, old London Bridge; and I think that hardly anywhere, save, perhaps, in odd corners such as one meets with in the elder part of the town at Cassel, will a cluster of buildings be found that, in all its bearings, carries one back so completely into a past age. It is often my pleasant task to point out to strangers who may be sympathetic lovers of domestic architecture, unfrequented "bits" in this ancient city; and I always reserve these houses till the last, saving them as a savoury morsel, as it were, after those of lesser interest have been inspected. It is with much regret, therefore, I must add that what the fiery element has spared them, the hand of Time has not dealt tenderly with; and, from a recent personal inspection, I very much fear they are doomed. Before many more years have run their course, these houses, like numbers before them, will have passed away, and only in the recollection of a few will their very existence be remembered.

Hence it seems that a note or two thereon is well timed. The old bridge over the Exe was built about 1250. It had twelve arches, and though much of it was destroyed during a great flood in 1449 and more of it collapsed in 1539, several of its arches stand till this day. The main road and traffic do not go over this now, however, for a new bridge, known as the Exe Bridge, was built and opened in 1773 a little higher up the stream, and the road was diverted to meet it. It is against the eastern side of the remaining fragments of the original bridge that the houses I refer to stand. Within the memory of many still living, somewhat similarly constructed buildings stood upon the opposite side of the bridge too. These were almshouses, and beside them, also on the bridge, was an ancient chapel to Our Lady, described in an existing deed so early as July 8, 1380. This chapel and the almshouses were taken down in 1833. Seen from the higher side of the water, the houses group very pleasantly. Upon the right hand is the western end and tower of St. Edmund's Church, a Perpendicular building, built of the warm red local stone, Heavitree or Pocomah. The stream just here is about forty yards wide; this is not, mark, the main portion of the Exe, but an arm of it, which joins the principal part again lower down. Three arches span the water, and upon each of these stand two houses. Upon the one end they abut right up against St. Edmund's tower. The middle opening is the widest, and the abutments are solidly built of the local stone already alluded to. Across them are huge oak beams supported by divers struts and corbels of similar material, and upon these the houses stand: the timbers being more or less bent with the strain upon them. By peering underneath, into the semi-gloom that exists there, it will be seen that, further in, the dark waters moodily flow through, not the piers only, but the actual old arches, or at least a part of them. These are under the roadway farther in than the houses. I regret very much that I do not hold the facile pencil of an Ernest George or a sketch of this interesting group should be published ere it disappears from mortal ken altogether. In each instance the lower

floors project out in open corridors over the water, and in one case stone steps lead down therefrom, against the pier, giving the inhabitants thereby access to the river beneath. These places are used by the occupants as washhouses, &c., and the clothes that may generally be seen hung out help the picture not a little. The two central houses are altogether more prominent than the others, and on one side assume a turret-like shape. The buildings are constructed entirely of timber, and in the main, are plastered. The window casements retain, in most instances, their old lead lights. The window openings are diversified, some curiously small (not a foot square), whilst the larger ones are invariably wide and low. The roofs are covered with slates, all of which, save over one house, are old. The height of these buildings above the water-line varies from five to twelve feet. The river flows over a sparkling, rippling weir on one side, before it pops in between the abutments; and this all helps the old-world look of the picture.

Seen from the other side—that is, from the roadway upon the Westgate Bridge—it will be found that the buildings are inhabited by folks in very humble life. The two houses nearest the church, after having for years exhibited the sign "Lodging for Foot-travellers," are now unoccupied, and it is not probable that they will be relet. It was here that, until recently, German musicians and the prettily-attired wayfarers who affect Italian costume used to find a resting-place; and very much in keeping they would look as, on a Sunday morning, for instance, I have seen them lounging about at door and over window-sill. These old houses have undoubtedly served their many generations; and now in their last days they retain to the full that quaint interest which gives that character and individuality to our old city of which no one is more proud than is the writer,

HARRY HEMS.

[Mr. Hems has sent a small sketch of the houses; but it is unsuitable for reproduction, or we should gladly have published it.—Ed.]

AMERICAN ENGINEERING.

WE have received the first number of the "Proceedings of the Engineers' Club of Philadelphia"—a club which has recently become organised, and which owed its origin to a few social gatherings of young engineers in Philadelphia during 1877. The number before us contains several useful papers of a practical character relating to engineering questions, many of local interest merely, but some of general value. The house and street drainage of Philadelphia is the subject of one paper by Mr. Rudolf Hering, C.E., in which the author advocates pipe sewers 12 and 15 inches in diameter instead of larger sewers, on the score both of economy and efficiency. The author, speaking of main sewers in Philadelphia, says, "I believe we could reduce the size of our main sewers nearly one-half without running any risk . . . the smaller the sewers the easier it is to ventilate them, and the greater will be the velocity for the same amount of sewage, and the more effectual the discharge." Frequent openings in the streets for the free entrance and exit of air is thought the best means of ventilation. As regards rainfall, Mr. Hering says that the sewers of Philadelphia are much too large; one inch of rainfall is calculated upon, but that there has never been a shower sufficiently heavy to fill any of the largest sewers, provided they were not tide-locked. If provision for half-inch rainfall per hour were made, it is thought to be ample. In New York, calculation for one inch is made, but it is shown that this estimate requires large and costly sewers, especially where the drainage areas are large, while the necessity for still more costly systems increases. Another paper, entitled "Empirical Formula for Strength of Wrought-iron Beams," by Mr. Percival Roberts, contains a few useful remarks. The empirical formula, has given the author remarks, very good results in practice, and is further convenient for rough calculations. We give it here:—

$$\frac{1}{3} \left(\text{area in sq. in.} \times \text{depth of bar in inches} \times 4 \right) = L$$

length of space in feet

L being the safe load in not tons, uniformly distributed upon a laterally-supported beam. If the load is in middle, the result must be divided by 2; if at any other point, the proportion of the rectangle of the segments to the square of half

the space must be taken. The weight of the beam is deducted from the results obtained. In the tables of the Phoenix and Trenton beams which follow, the calculated safe loads are very close to the results obtained from the above formula, the Phoenix giving from 3 of a ton to more than 2 tons more weight for a load upon the same section of beam (I-shape) than is obtained by the formula, while the table of the Trenton Company gives about as much less. The formula gives therefore a mean between the two. If we take an example from the tables, a beam of 10ft. span 9in. deep, 150lb. per yard, the Phoenix safe load is put at 19'70, while the formula gives 18'00 net tons. The rule, therefore, of Mr. Roberts gives a result exact enough for practical wants, where strict theoretical accuracy is not required, and as pointed out by Mr. Christie in the discussion, while it is too low for thin-webbed is too high for thick-webbed beams. Another paper by Mr. P. Roberts on the "strength of wrought iron in structures" reviews some valuable evidence upon the tensile strength of wrought iron. The author refers to the "Experimental Inquiry" of Mr. David Kirkaldy undertaken for the Messrs. Napier and Sons, published in 1864, in which that keen-sighted experimentalist points out the importance of closely observing the shape of the test piece with reference to the tensile strength obtained, also that the testing machine should be perfectly reliable. We may here give, in the words of the author, an important conclusion that cannot be too well known: "He found that if a bar, instead of being of parallel section, be turned down by sinking a fillet into it so that a minimum section occurs at but one point, that specimen would stand a much higher strain before breaking than a piece from the same bar whose section was parallel, the former contracting none whatever at point of rupture, while the latter would be much reduced. The mean of fourteen experiments gave, on the grooved section, 73,942lb. per square inch, while the same bars, not grooved, showed but 62,256lb. per square inch, a difference of 11,686lb. in favour of the grooved section!" The author considers such a grooved section utterly worthless as a test in specifications to give information, as it represents an artificial condition that rarely occurs in practice; on the other hand, the parallel section represents the most ordinary case of use. "To ascertain the limit of elasticity very accurately is surely of more importance than to have the tensile strength to within a few thousand pounds; for, strain a piece beyond this limit, and no matter what its ultimate strength may be, it is but a question of time when rupture will ensue." These remarks are sensible, and we endorse the opinion that if our "factors of safety" were proportioned to the elastic limit rather than to the ultimate strength, much safer and more accurate results would be obtained. Another suggestion as regards tension members is that they must be "double rolled from the muck-bar direct," to use a specification phrase. The practice of reducing and re-rolling bars is an additional security, as the bar by this process gets rid of the poor iron it may have in its composition. The "Scales of Maps," by Mr. Lewis M. Haupt, president, is the title of a paper pointing out the ambiguities existing in the use of ratios as expressing the scales of maps. The term "ratio" is not agreed upon, and confusion exists in designating the scales of maps and drawings. The author establishes the definition of a ratio "as being the expression for the value of the relation existing between two quantities, and as obtained by dividing the second by the first." The given object to be represented by the drawing should be considered the first, being the unit or measure with which the other is to be compared. Thus a scale of 1-5280 is 5,280ft. of field to 1 foot of map, or 1 mile to 1 foot = 1-12th of a mile to 1", and not 12" to 1 mile. It is shown, therefore to be inaccurate to indicate the scales of maps as so many inches to a mile—a very common mode of expressing scale. The expression $\frac{1}{2}$ " to 1' is also in the same manner incorrect, the inches evidently referring to the drawing and the foot to the object represented. It should be 1' to $\frac{1}{2}$ "—the antecedent referring to the object and the consequent to the drawing.

The Town Council of Harwich have obtained the sanction of the Local Government Board to the borrowing of £10,000 for the proposed drainage works, to be carried out from the designs of Messrs. Russ and Minns.

COMPETITIONS.

SPALDING.—The prosperous market town of Spalding, situate on the River Welland, is to become the possessor of one of the most useful institutions of ancient or modern times in the erection of the Johnson Hospital, for which a competition was advertised some months ago. For the accomplishment of this object every precaution has been taken by the charitable lady at whose expense the institution is to be erected, and we understand, endowed. From sixty sets submitted the number was reduced to twenty-five, as we stated last week, and afterwards to six, the authors of these being Messrs. G. G. Hoskins, Darlington; Giles, Gough, and Popplewell, Craven-street, London; F. L. Simpson, Wakefield; L. P. Grace, 38, Wigmore-street, London; Lloyd and Lunn, Leamington; Shields and Routhwaite, Sunderland. Since then the first premium has been awarded to Mr. G. G. Hoskins, and the second to Messrs. Giles, Gough, and Popplewell.

THE ORME BILLIARD TABLE DESIGN COMPETITION.—Messrs. Orme and Sons, of 11 and 13, St. Ann-street, Manchester, offer £120 for designs of billiard tables, &c., as below:—Class 1. £50 for the handsomest design of a billiard table, of any style. The design to be of a rich character, and regardless of expense in manufacturing. Class 2. £25 for the best design of a billiard table suitable for a house, of no special style or character. Class 3. £15 for the best design of an inexpensive billiard table. In this competition the judges will be instructed to select the table that combines the best effect with the least expense in manufacturing, a table for the million being the desideratum. Class 4. £10 for the best design of a marking board, combining the arrangements for scoring the games of billiards and pool. All the above designs must be drawn in ink. Class 5. £20 for the best sketch of an interior of a billiard room, ideal or otherwise, showing all or part of the billiard table, marking board, &c. This drawing must be in perspective, and not less than 20in. by 15in. This drawing may be executed in ink or in colours. With each design there must be a side view of the billiard table, drawn one-twelfth of full size, and another showing one leg, and a small portion of the side drawn to one-fourth the full size. It is not necessary that working drawings be sent, but if required they will be asked for. Drawings gaining a prize become the absolute property of Messrs. Orme and Sons. The drawings not gaining a prize will be held by Messrs. Orme and Sons, six months from the date of award, for the purpose of public exhibition, and on any orders being taken from any of the designs, not the prize designs, during that time, a commission of 2½ per cent. will be paid to the author of such design, but such commission will not be given on designs which are similar to those that Messrs. Orme and Sons have already executed work from. Competitors not gaining a prize may allow their drawings to remain with Messrs. Orme and Sons permanently, who agree to pay 2½ per cent. on all tables made from such design, within three years of the date of award; but such commission will not be given on designs that are similar to those that Messrs. Orme and Sons have already executed work from. Competitors must have their drawings delivered at 11, St. Ann-street, not later than June 18th instant, and all packages must be carriage paid. The judges are W. J. Muckley, Esq., of the School of Art, Manchester; E. Salomons, Esq., F.R.I.B.A., architect; and Mr. James Lamb, cabinetmaker, of Manchester.

THE STOKES-UPON-TRENT SEWAGE COMPETITION.

—In response to the invitation of the Town Council of Stoke for schemes for the treatment of their sewage upon seventy acres of land recently acquired about a mile from the town, twenty engineers sent in plans and reports upon the day named, the 8th instant. The lowest estimate for the entire work, which included the completion of the outfall sewers, the formation of roads and approaches, the laying out of the land and the works for the treatment of the sewage was £4,311, and the highest £20,710. Five of the estimates were under £10,000; twelve ranged from £10,000 to £15,000; two were under £20,000, and one was over £20,000. Eighteen of the twenty engineers advocated irrigation; two recommended precipitation by lime or chemicals, and downward filtration. Of the eighteen who recommended irrigation twelve advocated subsidence in tanks without chemicals and downward

filtration, and six recommended lime or chemicals for the purpose of precipitation. Six of the schemes recommended along with irrigation subsidence in tanks and downward filtration. The plans of Major-General Scott, C.B., F.R.S., of Ealing, and Mr. Gilbert R. Redgrave, who submitted a joint scheme, were unanimously awarded the first premium of £150. Those of Messrs. Bailey, Denton, Son, and North were selected for the second premium of £100. The scheme of Messrs. Scott and Redgrave involves the use of power for pumping the sewage, obtained by improvements of the Trent; the treatment of the sewage in tanks by the lime process; the employment of intermittent downward filtration for the night sewage, and the irrigation of the whole of the farm with the clarified effluent from the tanks. The total cost of the system is set down at £10,890, distributed as follows:—Improvements to the river, £875; roads and approaches, £695; completion of the outfalls, £4,065; preparation of the land, £920; and tanks, works, and machinery, £4,335. The scheme of Messrs. Baily, Denton, and Co. provides for an outlay of £14,032. It is proposed that Messrs. Scott and Redgrave shall carry out the work, in which case the premiums will merge into the commission.

Building Intelligence.

BLACKBURN.—A new Wesleyan Chapel, in Preston New-road, Blackburn, was opened on Thursday, the 20th inst. It is Gothic in style, of stone, with Bath and granite dressings. At the corner is a tower, with broach spire rising to a total height from the ground of 128ft. The chapel measures, internally, 78ft. by 60ft., and is fitted with benches of pitch-pine, varnished and stop-chambered; the pulpit is of pitch-pine and oak, and has a flight of stairs on each side. At the rear are the vestries. A gallery surrounds the chapel, and has a pitch-pine front. 1,033 sittings are provided. Beneath the chapel is a school-room 74ft. by 53ft., and 17ft. high, two class-rooms, each 14ft. by 11ft., fitted with revolving wooden shutters; a morning-chapel for week-day services, 35ft. by 21ft.; and two vestries. Mr. William S. Varley, New Market-chambers, Blackburn, was the architect, and Mr. E. Lewis, of the same town, the builder. The hot-water contract was taken by Messrs. Mercer Brothers, and that for gasfittings by Messrs. Freeman and Collier, of Manchester. The total cost will be about £10,000.

CARLISLE.—Rapid progress is being made by the contractors, Messrs. Morrison and Mason, in the extension of the Citadel Railway Station, about 300 men being employed on the job. The premises will be almost doubled in size. The platform on the east side will be greatly extended, so as to afford additional dock accommodation, and there will also be three sets of through lines, both north and south. The station will be about 1,000ft. long by 300ft. wide, and in the centre will be an island platform, 1,400ft. long. In the middle of this platform will be a suite of refreshment and washing-rooms, booking, parcel, and telegraph offices, and underneath will be kitchen, scullery, larders, wine and beer cellars, lamp, porters, and boiler rooms. These rooms will be lighted by Hayward Brothers' patent pavement lights, with semi-prismatic lenses, and communication will be made by hoists between the basement and rooms on the platform; while for passengers' access is provided to the platform both by subway, overhead bridge, and an inclined approach from the Viaduct. The station roofs will be supported on iron columns and girders, and will be glazed on Rendle's system. The works are being carried out from the plans of Mr. George Cunningham, C.E., engineer to the Joint Station Committee; Mr. W. Reid is inspector of works; while Mr. Waddell is the contractors' engineer, and Mr. Morton is their manager.

CHESTER.—A new altar dedicated to "Our Lady of Seven Dolours," was unveiled in St. Francis' R.C. church on Sunday last. The altar-piece is a life-size group of the Pieta, of Munich workmanship, which stands on a massive pedestal on the super-altar, under a deeply-recessed arch richly moulded and relieved with carvings of the Passion flower, leaves, &c.; in the spandrel of the gable above is carved a heart pierced by seven swords, types of the Dolours; a ribbon filling

up the same panel bears the following inscription in Latin—"And thy own soul a sword shall pierce.—St. Luke ii. 35." The gable terminates with a foliated cross, the height to top of which is 18 feet from pavement. The altar proper has an arcade of seven compartments in the centre, one of which is a panel with cross and winding-sheet; and in the other six are angles bearing emblems of the Passion. The altar has been designed and made by Mr. John A. Hauley, architectural sculptor, of Chester.

HAMPSTEAD NORRIS.—The work of restoring the interesting old church of St. Mary, Hampstead Norris, is about to be at once commenced, the restoration committee having accepted the contract of Messrs. Silver and Sons, of Maidenhead, for carrying out the alterations, according to plans prepared by Mr. Arthur Baker, architect, of York Chambers, Adelphi, London. The present church consists of a chancel, nave, west tower, and porch. The chancel is Early English. The nave, which is disfigured by most unsightly pews, has two lancet windows on the north side; those on the south side are chiefly Perpendicular. The north porch is plain Perpendicular; the doorway is Norman, with the billet moulding; inside is a deep Early English recess for the stoup; the south doorway is also plain Norman. The staircase to the rood-loft remains, and a small Perpendicular window to give light to it. The tower arch is Transition Norman, pointed. The tower is plain Perpendicular, with very thick flint walls. The roof of the nave is Jacobean, with the date 1635. On the north side of the nave the original stone consecration cross still remains.

INCORPORATED CHURCH BUILDING SOCIETY.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting at 7, Whitehall, last week. Grants were voted towards building churches at Abergynolwyn, in the parish of Llanfihangel-y-Sennant, Merionethshire, £80; Brynwyndham, in the parish of Ystrad-y-fodwg, Glamorganshire, £160; and Fairwarp, St. Mary, in the parish of Maresfield, near Uckfield, Sussex, £100; rebuilding the churches at Thimbleby, St. Margaret, near Horncastle, Lincolnshire, £45; and Trefilan, St. Hilary, near Talcarn, Cardiganshire, £80; and towards enlarging or otherwise improving the accommodation in the churches at Brassington, St. James, near Wirksworth, Derbyshire, £35; Friskney, All Saints, near Boston, Lincolnshire, £50; Hastingleigh, St. Mary, near Ashford, Kent, £35; Maresfield, St. Bartholomew, near Uckfield, Sussex, £50; St. John the Baptist, Timberhill, Norwich, £15; Narberth, St. Andrew, Pembrokeshire, £50; Todenham, St. Thomas-a-Becket, near Moreton-in-Marsh, Gloucestershire, £25; and Whetstone, St. John, in the parish of Finchley, Middlesex, £30. A grant of £30 was made from the Mission Buildings Fund towards building a mission church in the parish of St. Stephen's, Cardiff.

KENNARDNOTON, KENT.—The parish church of St. Mary, in the liberty of Romney Marsh, has just had its tower partially restored, from the designs and under the superintendence of John P. Seddon, architect, of No. 1, Queen Anne's-gate, Westminster. The present church is a comparatively small one, rearranged out of the ruins of a much larger one, which was partially destroyed by lightning in 1559. The result is a structure of singular picturesqueness and interest, consisting of a nave with south porch and chancel, the latter placed irregularly with regard to the nave, the north walls of both being in a line, while the chancel being much narrower than the nave, their central axes do not correspond. A north aisle once existed, as is evident by an arcade embedded in the north wall, and only visible on the outside of the church. The tower, which was to the west of this aisle, and in advance of the western walls of the nave and aisle, now stands isolated, and only attached to the nave at the south-east angle. There is a circular turret projecting from the north side of the tower, with a rude conical stone roof. Two magnificent middle-pointed traceried windows, partially destroyed and blocked, exist in the south walls of the chancel and nave. These are so far finer than anything else about the church, that they form a curious problem in themselves. The present condition of the church with that proposed, if it be possible, have been represented in two pictures prepared as a contrast by Mr. Seddon, and we propose to give

representations of them which may present a bone of contention for the Society for the Protection of Ancient Buildings, who may prefer the church in its squalor, with plastered ceiling pierced by the iron stove-pipe, with the rotten deal pews, to the view given with the windows mentioned reopened and refurnished with tracery, and the interior refurnished with screen and decorations as proposed. The work at present done, however, is confined to a faithful restoration of a crumbled and dilapidated western doorway and three-light window over, and a richly-panelled oak door with wrought-iron furniture, and the re-flooring and plastering of the interior of the tower, to serve as a Sunday-school room, as proposed by the Rector, the Rev. Sydney Loft.

LIVERPOOL.—The New Commercial Salerooms, Liverpool, were opened on Monday. The plans are by Mr. J. F. Doyle, architect, of No. 4, Harrington-street, Liverpool, and the works were contracted for by Messrs. Haig and Co., builders, of Fraser-street, Liverpool. The style is "Queen Anne," and the structure consists externally of a mixture of red brick, with Cefn stone dressings and unpolished Shap granite base. On the ground floor are offices, and a small private room for brokers. The rest of this floor is taken up by the fruit saleroom. This room and its approaches are lined with panelled dados of oak. In addition to offices, the first and second floors are fitted with lavatories, and the third floor is occupied by the keeper of the building. The total cost of the erection when completed will be about £15,000.

METROPOLITAN BOARD OF WORKS.—At the meeting of this Board on Friday, a long discussion took place with reference to the expediency of proceeding with the Tower Bridge Bill, the Government having declined to consider at the present time the extension of the coal and wine dues beyond £1,890 for that purpose. The works committee reported in favour of abandoning the Bill, but it was eventually decided by 19 votes to persevere with the Bill. It was decided to fence in Plumstead-common, at an estimated cost of £11,281 15s. The action of the Fire Brigade Committee in accepting the tender of Messrs. Stimpson and Co., amounting to £3,778, for the erection of a fire-station at Greenwich, was confirmed. Letters were received from the Home Office, transmitting letter from the Central Association of Master Builders of London, and copy of a statement of objections of their Association, and also of the London Builders' Society, to the By-laws made by the Board under the Metropolitan Management and Buildings Amendment Act, 1878, Section 16; these were referred to the Building Act Committee.

The Great Yarmouth Town Council have before them plans for providing additional house accommodation for the working classes on waste lands in their possession close to the town. One of these has been prepared by Mr. Baker, the borough surveyor, and shows a series of ten terraces running east and west, to be erected on land north of the workhouse, with 35ft. and 30ft. front roads, and 15ft. occupation ways between the double blocks. 234 houses are indicated, of which 216 have a frontage of 14ft. and depth of 35ft. each; these are estimated to cost £100 each in erection. The remaining 18 houses, facing the sea, would be of a superior class. An alternative plan for the utilization of the same site is that propounded by Mr. J. H. Bly, who proposes ten long streets running east and west, providing for the erection of 123 houses, with a frontage of 17ft. each, and gardens each 92ft. deep; no lateral streets are provided, but one plot in the centre is reserved for trade purposes, and another for a public building, and on the sea-front of these streets spaces are set apart for the erection of villas.

A new Wesleyan chapel was opened at Ladycross, near Launceston, on Tuesday week. The chapel is in the Early English style of architecture, and seats about 190 persons. There is a school-room 30ft. by 20ft., and a residence for the chapel-keeper attached, with a coach-house and stable behind. Mr. William Burt, builder, of Launceston, has carried out the work from plans prepared by Mr. C. P. Wise. The cost has been about £1,000.

At a meeting held at St. Matthew's Church, Walsall, it was decided to build an organ-chamber on the north side of the church, from the designs of Mr. Ewan Christian, of London. It was also decided to obtain estimates for the general restoration of the church in five sections, the proposed work including entire reseating, removal of galleries, and erection of three porches.

The Wareham Highway Board have elected Mr. W. W. Fookes as surveyor.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the **ENGLISH MECHANIC AND WORLD OF SCIENCE**, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation renders it the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price Twopenny, of all book-sellers and news-vendors. Post free 24d. Office: 31, Tavistock street, Covent-garden W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Front Page Advertisements and Paragraph Advertisements is. per line. No front page or paragraph advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—T. and H.—S. P. J. Co.—A. T. M.—C. H. S.—J. M.—O. Bros.—L. Bros.

E. A. P. (Yes, the book is published by B. T. Batsford, 52, High Holborn.)—INQUIRER. (The angle of 45° is taken from the sill of window and measured from the vertical face of wall. The obstruction opposite is supposed to clear this line. The subject was explained in the BUILDING NEWS last year.)—STUDENT. (A work on "Quantities," by Mr. Banister-Fletcher, and Dobson and Tarn's "Guide to Measuring and Valuing," are both good books on the subject.)—T. O., Grimsby. (If we understand you, the block plan measures by scale 100ft., whereas the land measures 110ft., and the latter dimension was written in figures on the plan. The builder certainly ought to work to the figures in this case, unless a contract was signed before the plan was figured.)—A. F. M. (A class for the study of the figure from the life is held every Saturday at the Royal Architectural Museum, 18, Tufon-street, Westminster. The fee is 3s. a month.)

"BUILDING NEWS" DESIGNING CLUB.

ROBERT BRIGGS. (The rules were published Sept. 20th, 1878, and a copy of the BUILDING NEWS of that date may be obtained of the publisher.)

H. RAY writes anent the selected design for 3 cottages. (Your second query is reasonable: the door would have been better a little further away from front door—not so central. The kitchen would perhaps be a little dark. W.C.'s are not well arranged. Your other queries are trifling, and you must remember it is impossible to get a perfect plan.)

OUR COMMONPLACE COLUMN.

C. F. W. AND OTHERS. (Received. Our Commonplace Column is published every fortnight unless any pressure on our space precludes. This has been the only cause of delay.)—J. D. B., C. W., G. H. G. (Original notes or apt quotations on graining, granary, greenhouse, groined vaulting, grotesque, grot, gutter, gymnasium, habitable room, hagiocope, half-timber, hall, &c., will be received on or before the 8th of April next.)

Correspondence.

THE ARCHITECTS' BENEVOLENT SOCIETY.

To the Editor of the BUILDING NEWS.

SIR,—In consequence of Mr. Mocatta's, the chairman's, remarks at the recent general meeting of this Society (see *Builder*, March 15th, 1879, page 293), urging the necessity of increasing the amount of the invested capital on account

of our frequently being unable to deal with all the distressing cases coming before the Council in a way adequate to the needs and deserts of the applicants, I have had a letter from one of the leading members of the profession—one who is serving on our Council, and who knows the good work done there—offering to make a donation to the Society of £100 if fourteen other gentlemen can be found to do the like within three months, so as to raise our funded stock over £5,000.

May I ask the favour of your giving this fact publicity in the columns of your paper, and thus oblige, yours, &c.,

J. GOLDCUTT TURNER, Hon. Sec.
15A, Wilton-street, Grosvenor-place, S.W.,
March 24.

CHAIR FURNITURE, &c.

SIR,—In your notice of my patent chair furniture in your last number you spoke of me as "the architect of Westgate-on-Sea." My connection with that place, which has ceased, was the starting it as a building estate by the erection of some bungalows there, four of which, freehold and furnished, were bought by Professor Erasmus Wilson. These formed the nucleus of what has since been developed into the flourishing town of Westgate.

I afterwards moved to, and have remained at, this place, "Westcliff, Birchington-on-Sea," 1½ miles westward of Westgate, where I have continued my system with great success, selling bungalows, freehold and furnished complete, even to a corkscrew, to gentlemen of position. Here I have gradually developed and perfected inventions for the construction of wooden bungalows, such as that in which I reside, and of their "chair furniture," of which you have given so favourable a notice.

Though called "chair furniture," and easily converted into various articles, their component parts of chairs and stools are not readily observable, so as to invite the "wizard's wand," unless real convenience require it.

By the inventions above referred to I am now able to export to any country not a mere shell of a house, but a complete bungalow residence, furnished with appropriate chair furniture, the whole safely packed in a small compass.—I am, &c.,

JOHN TAYLOR.
Westcliff, Birchington-on-Sea,
Thanet, March 25.

THE ARCHITECTURE OF THE FUTURE.

SIR,—In all ages architecture has found its highest form of expression in religious edifices. Why? Because real religion is the embodiment of man's deepest, noblest, most earnest aspirations. It is only natural for men to lavish their greatest skill, knowledge, and patience on such objects as most vitally affect their every-day lives. Therefore, it is not too bold a thing to say that it is not to our churches that we must look in the future for the highest development of architecture. How can we reasonably expect men to expend their best abilities on buildings which are used only for a few hours on one day in the week?

In the Middle Ages the Church was paramount there was but one form of religion in the land, men were earnest in their worship, and the result was that building arose which, in their way, have never been surpassed. The prevalent spirit in this respect was then more like that which exists in Belgium at the present time, where the churches enter largely into men's daily lives, and are not merely visited once or twice a week by respectable and wearied congregations. It would be equally useless to greet this change with joy or regret; it is enough to acknowledge it and act accordingly.

But if not in ecclesiastical edifices, where may we expect to find the highest development of our art? The answer has already been given—in those buildings with which men's most earnest aspirations are identified; in schools, colleges, hospitals, town-halls. Look at Manchester. She can produce a town-hall which is, perhaps, unrivalled; but she cannot build a cathedral. Everyone will help towards the former; only one sect will materially aid the latter.

There are few things more depressing than the prevailing notion that a building must be in some accepted style. "What style is it?" is

the first question; and if the architect cannot straightway give a satisfactory answer, his work is regarded with disfavour. The consequence of this is that church-building is little more than the solving of various archaeological problems, which different men affect with differing degrees of success. Every new departure is a revival. A revival! Why the very name condemns it. It is useless to try to pass off as a living man a ghastly galvanised corpse.

Of course, a new style cannot be invented at once; it must grow. But if men will only free themselves from the notion that new buildings must be built in some ancient style which has had its own good day, and died: if they will accept new materials and work upon them as artists, fulfilling in all ways modern requirements, we shall see the much-desired new birth. Meanwhile, it must be confessed that these conditions are being fulfilled more completely by engineers than by architects.—I am, &c.,

March 25, J. A. G.

BUILDINGS IN BOND STREET.

SIR,—Whether the shop, illustrated in your last week's number, merits the title of an "important addition to the street architecture of London" admits of question. Several "important additions," that is to say artistic and interesting buildings, have lately been made in the street, but those persons who have at heart the dignity and improvement of what the Earl Beaconsfield styles the most interesting thoroughfare in Europe, will probably consider the design under notice, and those premises a little above of the Messrs. Chappell, as veritable eyesores. Can you state, Sir, what is the particular style intended? The general appearance, in consequence of the window-heads being corbelled, is Gothic; but round arches, and the moulded pediments to upper windows and the doorway, are as decidedly Classical in character. The ironwork may be described as nondescript. Its want of vivacity in design is, however, more than compensated for by its being painted pea-green. The finial, on turret roof, is a caution. The description states that the carving is typical of the proprietor's cheese and butter business. I don't know how this may be, or whether the said business is supposed to have inspired the *motif* of the design generally. *Buttery* it may be—a compound of strange and questionable elements—but in my humble opinion it assuredly is not "the cheese."—I am, &c., M.

CHIPS.

A substantial red brick building has been erected on the Worcester-wharf, near Bridge-street, Birmingham, as a hall for the use of the canal boatmen passing through Birmingham. The building is three stories high, and contains on the ground-floor, large coffee-room for men with lavatories, and drying-room; coffee-room for women, with lavatories and a kitchen. On the second-floor is a lofty hall seating from 150 to 200 persons, vestry, caretaker's parlour and lavatories, and on the third floor are caretaker's bed-rooms. The architects are Messrs. Osborn and Reading, and the cost has been about £2,600.

The London School Board at their meeting on Wednesday ordered the school in Gillespie-road, Highbury-vale, N., to be enlarged by 200 places; the work will be carried on a schedule of prices by Mr. E. Lawrence, whose tender, amounting to £11,527, was accepted in May last for the erection of the original school for 1,000 children. The following expenditures were authorised for recently-enlarged schools belonging to the Board:—Winchester-street, Finsbury division, £143 2s. 8d., 400 school places, equal to a cost of 14s. 3d. per head; Hollydale-road, Lambeth division, £264 11s., 400 school places, equal to 13s. 2d. per head; and Ben Jonson, Tower Hamlets Division, £279 4s. 6d., 480 school places, equal to 11s. 7d. per head.

A Local Government Board inquiry was held at Hastings, on Friday, before Mr. Robert Morgan, C.E., into an application of the town council for sanction to borrow £3,300 for works of sewerage in St. Andrew's district, so as to prevent the frequent floods; and £16,900 for laying out the new park and for the formation of new roads connected therewith. Mr. Andrews, the surveyor to the town council, gave evidence showing the desirability of the proposed works.

Mr. John Braithwaite has been re-elected surveyor of Lower Darwen.

New schools are about to be erected by the Ore School Board from the designs of Messrs. Jeffery and Skiller, of Hastings, architects to the board.

Intercommunication.

QUESTIONS.

[5716].—**Imperial Hotel, Torquay.**—A client of mine wishes to build an hotel somewhat upon the plan of the Imperial, at Torquay, which I am told was illustrated in some of the building papers about the year 1866. I should be greatly obliged if any of your readers could inform me what date it was published, or where I can obtain a plan.—J. A. C.

[5717].—**Deals.**—Can any of the readers of the BUILDING NEWS give me some information on the following subject:—I am working under a specification which specifies second Petersburg deals to be used for joists, common rafters, &c., but in the description of materials at the commencement of the specification it states that all timber is to be free from sap, shakes, &c. Now the clerk of works is interpreting this literally, and entirely ignores that second Petersburg are not free from sap. The question is, can I be compelled to provide deals free from sap, &c., or is the law on my side if I refuse to supply any other kind than that specified? I did what other competitors no doubt did when making out their tenders—viz., allowed for second Petersburg only.—W. B.

[5718].—**Billiard Tables.**—Will any of my fellow readers kindly inform me of a good treatise on billiard tables? Also one giving all the different sizes and full particulars of same. Please state price.—C. P. L.

[5719].—**Wooden Verandah.**—Will some one give me a few practical hints about a verandah in wood?—H. R.

REPLIES.

[5699].—**Driving Sewer Headings.**—I am much obliged to Mr. Welch for his reply to the above query. May I further trespass on his kindness by asking for information as to the method employed for getting the dirt out of and back into the heading, especially when it is of considerable length? Is there any great difficulty in filling in after the pipes are laid on account of the limited headroom? Also, is there much trouble in getting the timber out in moderately good ground?—RESURON.

[5707].—**Haslingden Flags.**—In reply to M. Watson, I may say the flags and setts he mentions come from the localities mentioned in the specification, which are on the line of railway from Bury to Bacup, and very near to Manchester. The stone is of a good quality, bluish in colour, and very hard. I should say it is quite as good, if not better, than York stone.—J. A. C.

[5709].—**Perspective.**—In reply to "Interior," it may be best to imagine how practically to obtain a few leading lines—say, of the interior of a church, after which the other lines could easily be filled in. First, it may be as well to remark that the best and quickest way will be to geometrically draw the plan of the portion beyond the picture plane to the same scale intended for the perspective. Next draw on plan a centre line longitudinally through the nave and chancel. Next draw on plan a line at right angles to the former, and to exclude as much of the building as is not to appear in the picture. The position of this line will require to be determined according to the design as to whether there are aisles or transepts to span or otherwise, and as to the character of the nave itself, which if very long and narrow, would not be fairly conveyed unless much length were included in the picture by the trace or plan of the picture plane, and, moreover, the more the latter includes the greater the tendency towards sublimity in the picture so far as general effect is concerned, but the less the detail of arches to nave and clerestory windows can be developed. Next comes the distance of the base line on the geometrical plan. This must also be drawn at right angles to the longitudinal axis, on plan, and as it contains the station point or point of sight somewhere in its length it must be placed at such a distance from the plan of picture plane when considering the extremities of the latter at each end to be identical with the horizontal limits of the intended picture, that any two lines drawn from the extremities of the plan of the picture plane to any assured point in the base line and considered as the point of sight, shall not contain at the point of sight an angle of more than 60°—i.e., 30° on each side of the plan or trace of the central plane, which is an imaginary vertical plane intersecting with the axial vertical plane (which would pass through the centre of the ridge or ridge rib) at the extremity of the chancel or apse or as the case might be, and its other end would intersect or be identical with the station point wherever the latter may be placed. It could be placed in the axial plane, when it and the central plane would be identical, but such would be destructive of relief to the eye and utterly prevent our getting a perspective view of any existing planes parallel with and facing the clerestory wall planes, and being on the same side of the axial plane as the wall planes which they face. It is therefore necessary and customary to make the central plane and the axial plane contain several degrees, and the point of sight consequently to the left or right of the intersection of the axial plane and the base line which allows the opportunity of fairly depicting the details of the arches, windows, &c., on one side, and gives a good view of the roof. With respect to the base line, which, as we have seen, contains the point of sight, it may be so determined as to be much more distant from the picture plane, and which would much diminish the angle subtended by lines from the point of sight in such line, and which would give more grandeur of idea as to the building at the expense of not so fully developing the detail. Then with respect to drawing the perspective, it may be well to recollect that the picture is practically the converse of the geometrical plan we drew, having the picture plane as a neutral plane between the two; that is to say, that all lines at right angles to the picture plane and which on the geometrical plan diverge from the station point, will in the picture converge from the neutral plane—i.e., the picture plane to what is usually called the point of sight, but which might perhaps be more appropriately called the point of distance, and such point of distance or point of sight will be exactly opposite its correlative on the geometrical plan. Now to begin work. Draw radial lines, turn point of sight to the point denoting the plan of each vertical line required to be shown in the perspective. It

will be necessary in most cases to be careful and take the lines seriatim and transfer same by a slip of paper to the ground line of the picture plane on the perspective; then with respect to setting up heights they will be the same scale as the plan, as we are drawing in what we call parallel perspective (though to be correct the central plane could not then be oblique as we have it). The heights can be set up from the same scale anywhere along the picture plane, but in practice will usually be measured on the very vertical lines requiring them. On this system the perspective will show equal halves to any vertical plane being parallel to the picture plane and bisected by the axial plane, and their intersection carried to the picture plane by a line to point of sight and then transferred by slip of paper to perspective. It will frequently be useful to adopt proportional lines of heights for special cases within the picture plane in order to save drawing and confusion of lines, and it is also well to place the horizontal line—i.e., the height of the spectator's eye, high as he might be elevated. Truth will prevent our adopting a point of sight which, through the existence of a west wall, would have the visual rays intercepted; but where a western gallery exists there would be an excellent and possible place for a station point, and the horizontal line would be drawn at 5ft. above the gallery floor on which the spectator would stand. Then having a high horizontal line we shall have a good view of the building on four sides instead of three—viz., the roof, the side walls, and the floors and benches if shown, which will truthfully enhance effect and the better show bases to columns, &c. Having a good perspective floor view by very fine firm pencil lines, and the portions of same requiring *pro tem.* to remain on the paper, being drawn firmer and blacker, we can complete on plan in perspective the plan of whatever we require to set up vertically, and the sections of moulded principal rafters and of transverse ribs and of diagonal ribs can be drawn on plan in perspective and carried up to top of abacus and then drawn to their proper straight or curved lines as the case may be, bearing in mind that all portions of circles in roof ribs, which are in vertical planes parallel to the picture plane are seen their real form, and may be drawn with the compasses; but as it is said that there is not a really straight line in the Erechtheum, and in a really artistic building there should not exist a rigidly correct geometrical line either curved or straight, therefore the segments will be best drawn easy with compasses having needles. If drawn by hand alone they cannot average the true curve, and on the building nothing but the average of the true curve would be tolerated, and we should not depict what is worse, as a segment drawn by hand would compare unfavourably with one drawn by the compasses, as we cannot draw like Giotto. Diagonal ribs should be divided from the geometrical plan, on which they would be described as turned down on their horizontal axes, drawn on the paper, and their points projected to picture plane transferred to perspective. The height to each division will be taken from the drawing of curve on the plan. Intermediate ribs and liernes can be projected on the plan in a like manner, and transferred, &c. It would prove convenient in such cases to use thick tracing paper, as plan upon plan, again and again, must be drawn to obtain the necessary points, and any undue attempt to dispense with their necessary production must injure and tend to muddle and worry the paper, or else detract from the effect which the faithful drawing in perspective of the correct curves would produce; because a curve not a true one (on the average) must be a deformed curve, and such can be no more desirable in perspective than in geometrical drawing, and would never be tolerated except that the general beauty of the interior, together with colouring or etching, tends to conceal it.—HENRY AMBROSE.

[5711].—**Cricket Pavilion.**—Amongst the best and most favourably noticed drawings submitted in competition for laying out Roundhay Park, Leeds, was a very beautiful design for a double-fronted cricket pavilion, the author of which was Mr. Stewart, of Wool Exchange, Colman-street, City. I believe it was erected somewhere near London, but I am not certain.—C. MURFORD.

[5712].—**Lift.**—If "Hoist" will put himself into communication with us we shall be happy to give him any information he may require. An intelligible description would occupy too much of your space.—A. S. AND S., 43, Leicester-square.

[5714].—**Deficient Quantities.**—In a book entitled "A Legal Handbook for Architects, Builders, and Building Owners," by Edward Jenkins and John Raymond, barristers-at-law, dedicated by permission to the Royal Institute of British Architects, and published by King and Co., 12, Paternoster-row (5s.), your correspondent, "W. D. B." will find the following on page 73:—"When the contract consisted of a tender to execute certain work contained in specifications and quantities made out by the employer's surveyor and an acceptance of that tender, it is held that the builder could not recover as for extras for an excess of work performed in consequence of an error in the quantities." For a case where this point was thus settled, we are referred in a footnote on the same page to Coker v. Young, in Foster and Finlason's Nisi Prius reports. This case was tried in 1860. Mr. Jenkins, one of the authors of the "Legal Handbook" referred to, and whose address, I believe, is 5, Paper-buildings, Temple, would be able to give "W. D. B." further particulars.—NICHOL FILIUS.

STAINED GLASS.

STOW-ON-THE-WOLD.—The five-light west window of the parish church of Stow-on-the-Wold has been filled with stained glass from the manufactory of Messrs. Wailes and Strang, of Newcastle-on-Tyne. In the tracery are seven angels holding scrolls containing portions of the passage in Revelation—"Holy, holy, holy, Lord God Almighty," &c. The middle portions of the lights are filled by full-sized figures of Moses, Isaiah, Jeremiah, Ezekiel, and Daniel; and in the base of the window are subjects from the life of Moses.

The Lancaster Town Council are about to erect new markets from the designs of Mr. John Thompson, architect, of that town.

LEGAL INTELLIGENCE.

INSECURE SCAFFOLDING.—The Judge of the Sussex County Court district lately heard a case at Brighton, in which a plasterer claimed £50 damages, arising out of an injury received by the falling of a scaffold while he was working on it, said to be due to the negligence of the defendant, his employer, in having it improperly erected. It was shown that a scaffolding had been erected by a man who was not accustomed to such work, and on a bag of cement being thrown out of a window about 3ft. above the scaffolding on to it, it gave way, and the plaintiff was precipitated from it, and broke his leg. Plaintiff said that the scaffolding was 30ft. long, that it had only supports 3in. square, in the middle, and one at each end. The judge said: This is only one of many instances in which injury has arisen through scaffolding being improperly erected, and I am of opinion that all such erections should, like plans, be subject to the approval of some official appointed by the local officials. I know that when a large church was being erected here some time ago, the scaffolding, which was of immense height, was built by a labourer, who knew but very little about such work, and long ere the work was completed, the scaffolding had swayed over, and was only supported by the building, which was in course of construction. One tradesman who was engaged in the work objected to his men using the scaffold, but others were not so considerate. Very frequently are the scaffold holes too slender for the purpose for which they are used. The existing state of things is a crying evil, and should be remedied. Those engaged in the erection of buildings should be protected against employers who are not considerate, as well as those who are to occupy the buildings when completed. In these days of contracts, we cannot exercise too much official supervision.

Our Office Table.

SIR SIDNEY HEDLEY WATERLOW has a pretty little controversy on hand with the Duke of Richmond and Lord George Hamilton. Sir Sidney is chairman of St. Margaret's Technical School, Westminster, of which the head master is Mr. Goffin. Mr. Goffin is charged by the Science and Art Department with having obtained improper access to the examination papers which were to be used for the examination of his pupils last year. The examiners found, when they came to look at the answers, what they thought was evidence of mechanical answers learnt by rote. They made inquiries, which revealed that just before the examination Mr. Goffin had drilled his children in eight of ten questions on their papers. Further, they discovered that Mr. Goffin had, through the carelessness of the secretary of the school, had the papers for some time in his possession. There was a visit to the school. Mr. Goffin denied the charge, but, without affording him any opportunity of rebutting the evidence, the department refused again to accept him as an accredited teacher. It was mere waste of time for Mr. Goffin to appeal to be heard. His managers lost their trouble in writing on his behalf. The department had made up its mind. Sir Sidney and his colleagues being opposed to the appearance of injustice, refused to dismiss their master unless they heard the evidence against him. The department refused to give the evidence or to rescind its order. So the case stands. Mr. Goffin will shortly be made the subject of a Parliamentary debate.

The Southampton Town Council have, it appears, agreed to do the least possible in the way of providing public offices, and have referred the question to a committee who are empowered to call in an architect, if necessary, to consider and report upon the adaptation of the existing premises to Corporation and Post-Office requirements. If there are no means to build new offices, of course the patching up of the old premises at the least expense is the only sensible course, though in such case we cannot see the good of calling in an architect when the town have already plans prepared by their own consulting surveyor. As Mr. Lemon's services are included in his salary, why go to any further expense about what must after all be a mere makeshift for a few years? Such a procedure seems to us an unnecessary waste of time and money, and not flattering to their surveyor. The most amusing part of the affair is that the question has been made a party one and a test for electioneering purposes, while the most expensive mode of dealing with the old premises has been suggested.

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 4, 1879.

THE SOCIETY OF BRITISH ARTISTS.

THE pictures at the Suffolk-street Gallery of the above Society, if they do not quite equal former displays in some of the higher qualities of painting, maintain a fair average of excellence in landscape and *genre* subjects. The large room is adorned by works of some well-known artists, of whom we meet with the names of Goodall, Woolmer, Caffieri, Lee, R. Redgrave, Cox, Alfred Cole, Sir J. Gilbert, Bromley, Ludovici, W. H. Gadsby, Gerardin, Cobbett, J. Burr, Girardot, Bartlett, Clint, Hines, and others. To come to the most striking works first, we may place Mr. Caffieri's "Music Lesson" (13) in the front rank as a charming example of effective drawing and colour. A group of young ladies round a grand pianoforte are taking their music lesson in a spacious and richly furnished room, draped on one side with dark curtains. The window opening in the latter, through which a peep of green leaves is obtained, the light tints of the silk dresses—blue, pink, and buff—the blending of the colours and the truthful perspective, make up a very pleasing subject. Vigorously painted, yet delicate in tone, the picture is seen best at a moderate distance. One of the finest studies in forest life is "The Oak and Birch" (92), by Mr. Fred. Hines, the massive trunk and foliage of the oak and the contrast with the light feathery spray and silvery stem of its more delicate companion the birch, are admirably painted. Excellent as a transcript, it possesses a higher meaning in its contrastive power, while the manipulation is nearly perfect. A more impassioned piece, persuasive and emotion-moving in its direct appeal to human sympathies, is Mr. J. Burr's "Words of Comfort" (125). The handling is energetic and massive, and the depth of tone in keeping with such a theme. Mr. A. J. Woolmer contributes one of those epic landscape subjects for which he has a decided penchant. It is entitled, "The Primeval Forest: A Leaf from the Stone Book" (148). The artist has painted a grand old oak springing up amidst a scene of luxuriant vegetation and animal life, such as one may imagine to have existed in the primeval forest. The idea is poetically worked out; the dark grotto, and the grove beyond, with the trunks and branches of trees against the bright sunlight, the serpent entwined in the oak branches, the fowls of air and water, combine to present a picture quite antediluvian. Mr. Woolmer is a vigorous painter of nature in its grander moods. The luminous effect upon the trunk and foliage of oak, the brook below, and the water from the rock at the sides show a wonderful mastery in the opaque colouring of the high lights and the transparent or glazing tints over the deeper or darker portions of the picture. The scale of tone and the vigour of touch are no less remarkable. Another picture of some merit is No. 157, "Tired Out," exhibiting an incident that tells its own tale. The artist, Mr. A. Dixon, has covered a large canvas, fully sensible of a well recognised mode of enlisting attention. The subject chosen is a railway-carriage compartment occupied by a young soldier, a mother with her two children, both asleep, and a young girl attired in sombre dress, who is looking out into the dark night with a careworn, anxious, and tired expression on her face. The gloom of the carriage and the darkened features of its occupants, worn with fatigue and ennui, are well depicted. A few fine landscapes are to be seen.

We notice No. 181, "A Scene in North Wales," by Mr. E. J. Cobbett, remarkable for the cleverly-painted gleam of sunshine over some rugged uplands; the figures are less happy; No. 189, "Pastimes and Times Past," by Mr. W. Holyoake, boldly painted, yet stiff in execution; "Eagle's Crag, in Borrowdale," by Mr. J. Peel, a grand mountain piece, in which the colouring and effect of sunshine and atmosphere are rendered with considerable skill; No. 163, "Up Stream," by Mr. Stuart-Lloyd, clever in the handling of feathery foliage; and two pleasing pieces, Nos. 103 and 104, the first, "Temple Reach, Hurley," by Mr. A. de Branski, and the second, "The Last Swallow of the Season," by Mr. W. Gosling. The latter is a view of the Thames at Bolney, and the delicate drawing of the trees in their autumnal dress contrasts with the freshness of the piece above. One of the largest architectural pictures is Mr. Wyke Bayliss's "Interior of the Church of St. Remy, Rheims" (164). The artist has sought to embody the sentiment of the poet conveyed in the "Golden Legend," from the stanza:—

"Shafts of sunshine from the west
Paint the dusky windows red;
Darker shadows, deeper rest,
Underneath and overhead;
Slowly, slowly, up the wall
Steals the sunshine, steals the shade."

The red glow of the western sun and the misty stealing shadow over the arcades are painted with effect, but the perspective of the arcade is certainly faulty, and the detail carved string courses and capitals are coarse and lumpy. Compositions representing everyday-life and manners are, as usual, plentiful. No. 42, "Pensioners' Pensioners," is a homely incident told by Mr. A. W. Bayes with much pathos and feeling. The old women in the hall feeding sparrows are thoroughly characteristic of the comfortable hospital, and the expression on their faces betoken the interest they take in their kindly office. In grouping and colour the piece is admirable. Mr. Bromley, in the "Fruit Seller" (38), shows a Spanish brunette sitting on some steps with her fruits, her dark eyes turned askance. The colouring is bright and genial, and the execution clever. Sir J. Gilbert, R.A. (30), in his usual vein, depicts an incident in "Tristram Shandy," in which Corporal Trim questions Uncle Toby's paper projects. The scene is cleverly depicted, and the characters of Sterne's humorous story well sustained, though the drawing of table is poor and the red coats a little too harsh. Mr. W. H. Bartlett's portrait occupies a conspicuous place; it is of a young lady in sage-green, sitting in a red armchair, looking at an album. There is rather a meaningless intention in the piece, though the work is characterised by solid handling and depth of tone. No. 100, "Finishing Touches," by Mr. Watney Wilson, is the picture of an old Jew trimming his beard. The old man's face and hands are very transparently painted, and the chiaroscuro and execution leave nothing to be desired. The faces of the old man with gout, the wife, and the little girl in No. 178 "Kind Enquiries," are natural and carefully painted, and the artist, Mr. Hayllar, sustains his reputation as a truthful renderer of everyday life. Perhaps one of the most amusing of *genre* subjects is "Old Crabby" (176). The artist has caught the true feline expression of temper in the ears and eyes, while the intruding pugs are cleverly rendered. Mr. Ellis's "Forage Party" is forcible in colour, the geese and the grass, trees and hedge are painted in a vigorous and telling manner. One of the most remarkable pictures in the large room is by Mr. J. Morgan, entitled (No. 153) "French and English." Two parties of boys are trying their strength by pulling at a rope, one of the groups being numerically double the other. The smaller band has ap-

parently the advantage. Two urchins on the other side of a fence are, in a spirit of patriotic bravado, deriding the large party. We are struck no less by the expressive features of the boys engaged in the "tug of war" than by the gestures of the urchins who are lookers-on of the struggle, and the colour and finish of the landscape. In the north-west room one or two pictures attract attention. Mr. J. R. Ashton, in "Check," shows a game of chess. The two players are obviously adepts; but we pass the obvious plot to remark upon the bold and solid manipulation, the dark setting to the faces and chess-men, and the clever colouring. "The Abbey Trees" (173), by Mr. Stuart Lloyd, is a picture worthy of the artist's reputation as a painter of an unconventional school. There is a velvety softness in the background and foliage, and the flowering grass is characterised by a dexterity and softness of manipulation almost realistic, putting us in mind of those pictures reproduced through the agency of the camera obscura. "Learned Leisure" (475), by Mr. F. S. Muschamp, is a sentimental conceit—lady in golden-coloured satin sitting under a window of painted glass. The colours, the deep red couch and the dress, produce a rich cabinet picture. A fine landscape meets us in 456, entitled "Where the Wild Thyme Blows," in which Mr. Grace has realised, in his usual broad manner, the rounded masses of foliage and blue distance. Equally good, as a reminiscence of old church days, is Miss Jane Humphrey's "O, come let us sing unto the Lord!" (491), and Mr. Goldingham's jesters, called "One Fool makes many" (462); while Mr. W. Henry's view of "Canal and Civic Hospital, St. Mark's, Venice," is an architectural subject, well painted.

No critical observer can fail to notice the almost unanimous return, among artists of figure-subjects, to the costume of the last century, and that which preceded it. Periwig and knee-breeches, the rosettes and court-dress of a former generation—even Regency dandyism—are becoming the fashionable habit among artists who once were wont to clothe their figures in ancient togas, or to wrap them up in cloaks. In this respect painters are keeping architects company, and it certainly would be rather an anachronism to introduce modern dress into a room of 17th century style and furniture. In such guise, anyhow, we have several pictures. Mr. J. Rick's "Evil Beginnings have Bad Endings" (424) is a clever subject, though, we must confess, a trifle obscure in its meaning. An old man in wig, doublet, and surtout, is playing whist with a young man—it may be a son—while above the latter, in the corner of room, is a mirror, in which is reflected the hand of cards of the latter. The faces of the players and the accessories are admirably rendered. Singularly faulty in drawing is Mr. Hawkins' allegorical subject, "The Progress of Time, representing the Sun-dial in Aldbury Churchyard, Herts" (425). The figures are crudely painted, and there is a general want of scale. A forcible picture is No. 403, "Guilty, or Not Guilty?" by J. Faed. The prisoner's scowl, as he is brought in between two soldiers, is a masterly piece of expression, and the colouring is equally good. We can only glance at Mr. Ludovici's "Dancing Class" (228), depicting a row of girls in coloured dresses being taught by a master; it is a clever, vivid piece of colour, admirable in drawing, and like all this artist's works, displays an energetic style of manipulation thoroughly characteristic. No. 360 is a grand Alpine piece, "Morning in the Alps"; the pine and the sunlit peaks produce a striking ensemble. A few others we note by number as skilful renderings of everyday life; such are Nos. 292, 256, 240, 299, 210, 215, 386, 383, 532. Mr. J. Ellis's drawing, 505 is a vigorous handling of sea and shadow,

though too rough and dauby in its near effect to please the ordinary run of picture fanciers. No. 504 is a clever figure subject, and Nos. 506, 512, 517, 530, and 538, are also striking pictures.

The water-colour subjects do not come up to previous exhibitions, and our space will not permit us to individualise the best even of these. Some of the subjects are singularly feeble, and a few sensational in style and execution. In this class we place Nos. 553 and 725. The view of St. Wolfran's, Abbeville (584), is a large subject, spoilt by the inky tone of the noble front, and the drawing suffers from crudeness and lack of aerial perspective. Mr. D. Law sends, as usual, a few conscientiously-drawn landscapes, 724 being the boldest. No. 776 is clever in its foliage and distance, and the hazy effect over mountain; 570 is a sunny piece, and 571 very natural. For truthfulness of colour, and simplicity and breadth of execution, Nos. 601 and 602 are, without doubt, exceedingly conspicuous among so many attempts at artificialities of style. They remind us of some of the better works of Pyne or Peuley, depending for their effect on local colour and transparent shadows, broad in handling, and without that painful, affected manner noticeable in many works in the same room. Nos. 627, 648, 699, 694, 625, 624, 622, exhibit skilful drawing, and come within the class of genuine water-colours.

THE MAINTENANCE OF MACADAMISED ROADS.*

ROAD making and maintenance is an art that has been pretty much left to tradition, the most experienced roadmakers having furnished little or no written instructions. Since the days of McAdam and Telford, the literature of road construction has been very scantily added to, and the secret of good roads has more or less remained in the keeping of turnpike, town, and country surveyors. Mr. Thomas Codrington, M.I.C.E., the general superintendent of county roads for South Wales, has in some measure supplied the want by publishing a treatise on "The Maintenance of Macadamised Roads," giving the result of experience and observation relating to the systematic management of roads. The author brings considerable knowledge and observation to the task, mainly the result, it would appear, of having the superintendence of a large area of road maintenance. The conclusions of foreign engineers have not been overlooked, for we find the "Annales des Ponts et Chaussées," and other authorities, have been consulted, and many valuable experiments with reference to the bulk and weight of broken stone for metalling, the "draught" of vehicles, &c., are given. In the last-named matter, Morin's and Dupuit's experiences are recorded, besides those of Sir J. Macneill and other engineers. The author, agreeably to the best experience, lays great stress on the necessity of good drainage of road surface and subsoil. It is now generally agreed that attention to these points is absolutely essential to economy of maintenance, and that, though the first cost may be large, a well-drained road is the cheapest. Some useful hints as to the various modes of cutting drains for the foundation of a road are given which would have been more practically useful to a large class if illustrated by a few sections. In speaking of roads in open level districts, the author says the field side of the fences, where the width of land taken is limited, is the best place for the sunk side-drains or ditches. In cuttings, the drains are best under the "water-table," or side channel, cut about a foot below the

formation surface, and filled in with rubble-stone up to the road materials. In sidelong ground, catchwater drains should be provided, to intercept surface-water from the high ground in addition to the covered drains. Sometimes, besides the lateral drains, cross, or "mitre drains," are necessary to be cut, meeting in a V in centre of road, and discharging into the side ditches. The author says a fall of one in a hundred is sufficient for these drains, which may be cut in the formation surface about 6in. deep by 12in. wide, filled in with broken stones or pipes, or, better still, small box-drains, consisting of dry side walls and a cover-stone. Speaking of the cross section of a road, upon which much has been said, Mr. Codrington advocates a moderate degree of convexity, just sufficient, in fact, to throw the rain-water off freely. The evil of a too convex contour has been found to be the tendency of the traffic to use the crown of the road entirely, as the only part where the vehicles can run upright, the consequence being that a hollow track is formed which retains the water, and the road wears unevenly. In flatter sections a more even wear is the result. Telford adopted a flat elliptical curve, more convex in middle than at the sides; Walker, a section composed of two straight lines, joined by a curve in the middle, having a fall of 1 in 24 at the sides, but, practically, a segment answers the purpose, the main consideration being regularity of section and evenness. The author observes:—"A fall from centre to the sides need not be generally more than 6in. on a road 30ft. wide, and should never exceed 9in.; for a road 18ft. or 20ft. wide 3in. or 4in. is enough." Roads with gradients need less curvature of section than level roads, though this rule is not always attended to. The curvature of section may be given by forming the bed of the road with a fall from centre, or by diminishing the thickness of road coating towards the sides. Telford used to form his road-bed level in cross section, giving the convexity by diminishing the bottoming of gravel at the sides. A carefully-laid bottoming or pitching of stones on edge, consolidated by beating with a large hammer, is better, we believe, than Telford's plan of forming a regular pavement of stones. The method of McAdam, who dispensed with an artificial foundation, and placed his broken stone directly on the native subsoil, has generally been followed, however, by modern road-makers, though we find the author inclined to disapprove of the practice. We are disposed to think a flexible road substratum the best both for wear and traffic, if inequalities are filled in; we also differ from the author in thinking a uniform thickness of metalling the best; it is better, we think, to cut the formation surface to a slighter curve, to give a thickness of metal diminishing at the sides. Concrete foundations, introduced by Macneill, are, perhaps, better than pitched where much traffic exists, and lias lime concrete, 12in. thick, has been used under the macadamised roadways of the Victoria and Chelsea Embankments. When set, 6in. of granite were laid over it in two courses well rolled. In speaking of broken stone roads, the author says a thickness of 3 to 6in. should be laid on first, choosing dry weather for the operation; when consolidated, or partly so, under the traffic, and the ruts filled in, other coats may be added until the thickness is reached. "The layers after the first will work in better if laid in wet weather." . . . "It is best to give a new road a stronger coat than would be enough for an old road under the same conditions of traffic and situation, and it is seldom advisable even on the best bottom to make a new road less than 6in. thick. On a well-drained bottom this will make an excellent road sufficient for a considerable country traffic. McAdam considered that 10in. of

well-consolidated material was enough to carry the heaviest traffic on any substratum, experience has proved this to be true with a well-drained and properly kept road, and even in the macadamised streets in London. It is seldom necessary to give more than 8 to 9in. thickness, and it is better to add gradually by successive coats of metalling to a road made at first rather too weak for heavy traffic than to give the whole thickness at once." The remarks on water-tables, rolling, &c., will be found of practical interest, and we pass them over with the remark that the author recommends a binding of limestone detritus or road scrapings when the road materials are siliceous, and sand for limestone materials—chalky or clayey binding being avoided. As to cost of macadamised roads, the author says, with materials at hand, a good road may be formed and coated for 1s. or 1s. 3d. per square yard, and a London street constructed in the best manner, with 9in. of Guernsey granite, may cost as much as 6s. to 7s. per yard. The suggestions on road materials, stone breaking by machinery, and the cost will be found useful to surveyors generally. The "composition of road coating," or the space taken up by broken stone of different sizes, is discussed in detail, and numerous experiments and results are quoted, into which we cannot enter here. If we take the author's examinations, it appears that no matter what the strength of road, or its thickness, or material, or traffic, the proportion of mud that can be washed out, and which forms the binding material, is about the same. Some interesting experiments made by the author are described, for determining the effect of heavy loads on wheels in breaking the road coating; which only prove the great damage done to roads by heavy loads carried on narrow tires, and that considerable wear is due to this cause alone. The chapter on "Measurement of Traffic and Wear" exhibits the French mode of finding out the amount of wear; but there are so many factors at work that it is difficult to draw any safe conclusion from the experiments. From numerous observations it has been found that about 100 cube yards per mile per year is the average consumption of good roads, though in the metropolis six times that quantity of granite have been used annually per mile. In spreading road materials on old roads it is suggested that they should be laid on in small quantities where hollows or weak places occur, or where necessary, to preserve the cross section of the road, and this patching should be done with care, not in square patches, the angles of which are wasted or got knocked away, but in oval or circular forms, according to the shape of the hollows. Autumn and early winter are the best times for repair. The custom of loosening the road surface with the pick is thought undesirable in weak places if the border round the patch be slightly loosened to give the new stones a hold.

We cannot refer to many other useful hints given under this heading, perhaps one of the most important sections in the book, as the economical maintenance of a road largely depends upon the manner it is patched and the removal of the detritus resulting from the wear of material. Regarding the latter, the author advocates a thorough removal of superfluous mud, so as to keep the road hard, though he acknowledges that scraping may be carried too far, by removing stones of a size which would be useful in the road and increasing the wear of it. Bayley's hydrostatic vans for watering are recommended as saving, and Mr. W. J. Cooper's patent for mixing chlorides of calcium and sodium with the water is spoken of, though the results are not favourable to their use. Some useful data as to cost of labour, and its proportion to materials, are given, from which we gather that the cost of manual labour is generally from 30 to 40 per cent. of the

* The Maintenance of Macadamised Roads. By THOMAS CODRINGTON, M.I.C.E., F.G.S. London: E. and F. N. Spon, Charing Cross.

combined cost of labour and material. In South Wales the manual labour is from £7 4s. to £9 1s. per mile of road per year, or from 2s. to 2s. 10d. to a cubic yard of materials laid. In London the cost of maintaining macadam roads is from 2s. to 3s. 6d. per square yard annually. Mr. Codrington does not compare the cost of wood or asphalt with macadam, though there is a decided difference in favour of the first. Generally, it is shown by the author that no real economy is to be gained by saving labour in surface-work and in the removal of the worn-out materials from the road. The advantage of having men in charge of certain sections of a road is pointed out, as they become familiar with the peculiarities of them and begin to feel an interest in their labour. The road-surveyor's duties are discussed, and the author counsels care in the preparation of estimates and in accounts of the actual expenditure on different roads year by year. The expenditure on repairs should be kept distinct from cost of management, and the labour on surface-work from that pertaining to materials. We unite in the hope that the New Highway Act will systematise the maintenance of our highways, by requiring the accounts of expenditure on roads to be rendered to the county authority, so that a useful comparison may be established for future guidance. The appendix to Mr. Codrington's book contains forms for annual estimate, accounts, &c., and adds to the usefulness of a guide that will become almost indispensable when it is known.

ARCHITECTURAL MOSAIC.

III.—MEDIÆVAL MOSAIC.—(Continued.)

WE have now described all the principal kinds of Middle-Age work. To speak much of the pictorial design of each school would far exceed our limits; and we prefer the more practical task of describing as much as can now be ascertained of the technical methods employed. The mode of preparation of the materials for glass mosaic was long preserved as a secret art, handed down traditionally among the workmen. Ancient MSS. have however been discovered of late years, which throw some light upon it. From one of these, known as the "Bolognese MS." we extract the following particulars. This MS. was written in the 15th century, in a kind of Italianised Latin, and has been long preserved in the library of a convent in Bologna. The following translation is by Mrs. Merrifield:—

HERE BEGINS A TREATISE ON MOSAIC COLOURS,

And First How to Make the Material for the Mosaics.—Take lead and tin, of each 1lb., melt them together, and calcine them with common salt, until the whole is reduced to powder in a reverberatory furnace, and then melt the mass and add to it its own weight of raw tartar, and reduce it to powder, and mix it again with common salt, and put it in the reverberatory furnace for one natural day. Then wash the salt out with common warm water, and add more salt, and calcine it again, and continue this until it becomes a white calx. Take 7lb. of this calx and 1oz. of calcined bones, and mix all together, and put the mass into a glass pot, melt it and let it remain in fusion for three days, and try with an iron rod whether it is well digested and mixed, and it will be mosaic or white glass, of which you may make all other colours in glass as follows: To 8lb. of the said material put 1oz. of zaffirdi in powder and mix it well with an iron rod, and when it is quite melted, try with a little of it whether it is a good blue; if not add a little zaffirdi, and let it continue liquid until it is of a good colour. Then cast it, and it will take whatever shape you like, but take care of the wind while you are casting it.

Another Kind of Mosaic.—Take 1lb. of crystal glass and put it in the fire, and, when it is red hot, throw it into spirits of wine in which roche alum is dissolved, and so quench it sixteen times, and then pulverise it on porphyry and mix with it three times its own quantity of ceruse in powder. Fill a jar half full with it and cover it and lute it down, and put it in a soda furnace and let it remain there as long as if it were soda, and when it is cold you

will find your material fit to receive whatever colours you like.

To Make a Saffron-coloured, that is Golden coloured, Mosaic.—Take some of the prepared material and add to it 1oz. of the saffron of Mars, and mix with it 8lb. of the prepared white material, and let it stand until it is of a gold colour. If it does not become so, add a little more saffron of Mars, and it will certainly be like gold.

But if you wish to make a red mosaic, put into the white material 1oz. of alcaun (?) and 1oz. of calcined brass to 8lb. of the said material, and it will be red. But, if you wish to make black mosaic, melt 1oz. of iron and 1oz. of tin, and throw powdered sulphur upon it, and it will make a very good black.

To Make Red Mosaic.—Take 3 parts of the white material, 1 part of calx letitie, that is calx of gold, 1 part of ashes of verzie and 3 parts of sal gem in powder; mix the whole well together upon porphyry, and set it to melt in a glass pot in a glass-furnace and let it remain there for four or six hours; then take it out and you will have a red mosaic.

To Make a Rose-coloured Mosaic.—Take 3 parts of the white material and 3 parts of calx letitie, that is calx of gold, and 2 parts of cineris pencholini, i.e., brass burnt and reduced to powder, and 3 parts of sal gem; pulverise the whole together, and do as you did before.

To Make a Pomegranate-coloured Mosaic.—Take 3 parts of the said material, and 1 part of calx solis, i.e., calx of gold, half a part of manganese (?), and 1 part of sal gem, and do as before.

To Make a Blue Mosaic.—Take 3 parts of the said material, 2½ parts of ultramarine azure, and 3 parts of sal gem, and it is done.

To Make a Green Mosaic.—Take 3 parts of the said material, and 2 parts and 2 oz. more of calx of iron, and 3 parts of sal gem, and it is done.

To Make a Chrysolite, i.e., Glass of the Colour of Gold.—Take 5 parts of the said material, 10 parts of calcined lead, 10 parts of sal-gem; put the whole into a furnace together for five hours, and it is done.

The directions given in several other Mediæval MSS. which we have seen closely correspond with the above; but it will be interesting to the practical worker to compare with them the results of a modern chemical analysis which was made some years ago by Professor Branchi, of Pisa, who procured a number of mosaic fragments from Rome and Pisa, for the purpose of ascertaining the composition both of the materials themselves and of the metals with which they were coloured. Several variations appear as the result; e.g.—In the Pisan mosaics the red colour appears to have been produced from copper, while in the MS. it is produced from gold as well as from copper. Again in the blue, which according to the MS. was coloured with "azzurri ultramarini," was found by analysis both of the Roman and Pisan material to be produced from copper; and the green of the Pisan mosaic was produced by copper, that of the MS. by "crocus martis" and sal-gem. Professor Branchi considers that the modern art of colouring the glass is superior to the ancient, and questions whether the old workers were acquainted with the use of oxide of cobalt for blue, which had been said to have been known even to the Egyptians, because the oxide of copper was sufficient for the purpose, and because in the specimens examined by him, when seen by refracted light, the characteristics of cobalt colouring, as pointed out by Bergman, were wanting entirely. The following are the Professor's words on various colours:—

"I observed also that the last mentioned glass (i.e. the blue specimens), preserved, as it should do, its own colour after being pulverised and fused by fire with a small quantity of carbonate of soda, whilst that from Rome passed to an amethystine colour, which the Pisan glass also acquired, although in a less degree, having been both pulverised, mixed with carbonate of soda and exposed to the same degree of heat. Having treated in the same manner the other enamels of various colours and more or less opaque of the mosaic of Pisa, I saw that the red passed to a blue colour, that the purple was changed to an amethystine colour, and that the black became a transparent yellow glass, on the surface of which was an alkaline stratum of a bluish green. Having repeated these last experiments, I obtained from the dark green, light green and purple enamels, results differing from the preceding in the gradation of colour only. From the red I afterwards obtained a

transparent glass of a yellowish green colour, from the black a violet or amethystine glass. These alterations and anomalies, some of which throw light on the nature of the blue glass of the ancients, are to be ascribed to the greater or less degree of oxidation of the metallic colouring matters."

In the oldest mosaics of St. Mark's, according to Sir H. Layard, there are no true reds or purples, owing to the difficulty of their production; and according to Mr. Fergusson there are no reds, or very dull ones only, in St. Sophia; while in other churches of Constantinople, dating before the Turkish conquest, the reds exceed all other colours in brilliancy.

One of the most beautiful features of mediæval mosaics is their *gilding*. A method of producing gilded mosaic, which was known in the old Roman times, and continued for many ages, was to cover a film of leaf gold placed on the vitreous material, with an actual piece of thin glass, and afterwards to unite the whole into one mass by the action of fire. But according to a later and more improved process, the covering material was little more than a "vitreous varnish," scarcely distinguishable from the gold which it protected, except by having a shining, non-metallic surface, and by the resistance it offered to iron tools, and to the action of mercury and nitro-muriatic acid. The probable method by which this extremely thin covering was applied, was that glass or crystal, easily fusible, was reduced to an impalpable powder, which was distempred with water, or with a solution of gum, or of borate of soda, or other liquid, that this mixture was spread over the gilded surface, and that finally the whole was exposed to heat, which fused the powder into a fine varnish, which has resisted not only the above named re-agents, but now, after the lapse of six centuries, appears without the slightest alteration in the same state in which it left the hand of the artist. The best gold-ground mosaic is undoubtedly that in which this covering material is thinnest.

The cement or stucco with which the mosaics were fixed was of the very greatest importance, and each artist is supposed to have had his own secret and favourite methods of preparing it, but according to Vasari it consisted of slaked lime 1 part, pounded marble 3 parts, mixed with water and white of egg. But as this hardened too quickly there was afterwards used a mixture of 1 part of slaked lime with 3 of powdered travertine stone mixed up with linseed oil, and kept stirred every day during use, adding oil as it dried. The following account of the analysis of the cement used in the mosaics of the Duomo of Pisa, made by Professor Branchi, of Pisa, will be of great interest to the practical worker:—

"The cement or bed of the beautiful mosaic of the Tribune of the Duomo of Pisa consists of two thick strata one upon the other. The lower stratum, which is white, tasteless, of a texture apparently homogeneous, soluble in acids, with liberation of carbonic acid, consisted undoubtedly of a mixture of slaked lime and marble dust. Having tested the weight of 2 denari (grammi 2.358) with acetic acid, there remained only silica and yellow oxide of iron, weighing 1½ gr. (grammi 0.085). The superior stratum in which the parallelopeds of coloured glass were embedded consisted of a yellowish mixture somewhat hard, which acquired on lighted charcoal a colour that was first grey and then blackish. The same acetic acid to the action of which I exposed an equal quantity of this layer as of the lower, dissolved the lime with slight ebullition, and left 12½ gr. (grammi 0.613) of a substance of a dark yellow colour, which I found was composed of linseed oil dried, and a small portion of turpentine, and of other resinous matter. The cement of the mosaics of the cloisters of the Basilica of St. Paolo, without the walls of Rome, was composed of slaked lime and brickdust more or less finely pulverised. It was of a flesh colour, unalterable by fire or exposure to the sea wind, and of a taste slightly saline. By means of an analysis, sufficiently accurate for the purpose, I find in the same quantity (viz., 2 denari) that its constituents were nearly as follows:—

	Denari.	Grains.	Grammi.
Carbonate of lime	1	3½	1·350
Pulverised bricks deprived by acetic acid of their calcareous parts	0	11½	0·572
Muriate of soda, earthy muriates, and a little cal- careous sulphate	0	8¼	0·433

By these results I have learned that the grounds of the mosaics were not always prepared in the same manner."

Sir M. Digby Wyatt was of opinion that the ancients probably used for their finest pictures some retarding agent, such as beer or honey, which would tend to keep their cement plastic longer than it would if mixed with water only.

The method of working differed from modern methods chiefly in the fact that the ancients worked exclusively from the front, while many modern mosaics are prepared from the back, and affixed to their places in *plaques* or sections. The surface to be decorated, built of brick or stone, was first rendered with rough plaster, to make a key for subsequent coatings. Then a strong and fine plaster, nearly 1 inch thick, was put upon it. Cartoons or drawings of the subject were either placed within view of the workman as a guide or were drawn upon the plaster itself. The beginning was always made with the most important part of the design, the artist first knocking out with his chisel a portion of plaster corresponding in size to that which would be occupied by a few tesserae. He then selected a piece of the vitreous material of the proper colour, from a tray in which the various colours were arranged. This would be about the size of a circle 5 or 6 inches in diameter and ½ an inch thick. To cut this to the shape and size required he placed it upon a sharp edge of iron, and struck it with an edge tool, exactly plumb with the under iron, and thus fractured it in a direct line between the two edges. An earlier method was to draw a hot iron along the line in which it was desired to make the fracture. When he had thus obtained the small piece he wanted, he took some fresh cement (made of 1 part lime to 2 of marble dust) inserted the piece and pressed it till it was flush with the adjoining plaster, and he could see whether more cement was wanted, and so proceeded till he had finished a face, or some other leading feature, which being done, the superior artist allowed some inferior hand to fill in the draperies and less important parts of the design, while he himself commenced in some other place.

The work thus performed, it must be acknowledged, has often a much greater effectiveness than the extremely smooth work which is performed by the modern method. In the old work there is an endless sparkle and diversity of tint, which frequently contrast painfully with modern restorations in the old buildings. The modern artist has aimed at a fineness, smoothness, and regularity which the old workmen seemed not to care for; and with the result that while the modern work glistens painfully like a single sheet of burnished metal, which some have compared to a "copper cauldron" effect—the old work, having been fixed by the method described, it was impossible to bring each separate piece of glass into an absolutely true place, and consequently they are all seen at thousands of angles, differing some widely and some microscopically, but all reflecting light at different degrees. This it was, combined with a judicious coarseness of execution in work placed at a distance from the eye, which happily gave to the old mosaics that glorious brilliancy and variety which they retain to the present day, and which the modern mosaicist would do well to emulate.

ERRATA.—In our last article, on p. 321, first column, line 28, "remaining" should read "retaining," and in the next column, first line of last paragraph, for "discovered" read "discontinued."

ARCHITECTURAL GEOLOGY.—VII.

IGNEOUS AND METAMORPHIC ROCKS.

IGNEOUS rocks are those which at some time or other during the earth's history have been in a molten condition, from which they have been formed into a solid mass either before the deposition of the overlying sedimentary and fossiliferous rocks, or have been forced up from below in a fluid condition after the formation of those strata which they are often found to pierce through and overflow. Igneous rocks are not always the most ancient, as we find them occurring in nearly every geological age, even down to the end of the Cretaceous Period. Thus, in the Lake district of the north of England, we find a mass of basalt piercing the green slates; they must therefore have been forced up after those rocks were deposited, but previous to the formation of the Old Red sandstone. In Leicestershire the syenite has pierced the coal measures at Mount Sorrel, and has charred the coal through which it has passed, converting it into coke, and rests in a mass above the carboniferous strata. At Dartmoor, in Devonshire, the granite was probably formed during the Permian period, since it has altered the carboniferous rocks with which it has come in contact. In Scotland, where granite abounds and is found in large masses, it appears for the most part to have been the most ancient of the rocks, from the decomposition and weathering of which the sedimentary strata have been formed; but in some cases we find it piercing the overlying schists of the Silurian period in Dumfries and Galloway, the molten granite having penetrated the other rocks in the form of veins.

Porphyry, which consists of compact felspar, in which large and distinct crystals of quartz and felspar are embedded, is undoubtedly of plutonic origin, having penetrated the other rocks in the form of "Dykes," and formed intrusive sheets coinciding with the bedding of the stratified rocks. In North Wales the porphyry is found embedded with the slates and grits of the Silurian period, forming beds of great extent and thickness, and protruding in enormous bosses through the sedimentary strata. In Devonshire the porphyries appear to belong either to the Devonian, Carboniferous, or Permian epochs, having been erupted and spread out in a liquid state over the bed of the sea in which those strata were in course of deposition. In the south of Scotland the porphyry underlies the coal-measures, and rises from under them on the banks of the Clyde, forming the hills of Kilpatrick, Campsie, Kinross, Largs, Gleniffer, and Neilston, as well as the escarpments of Salisbury Crags and Arthur's Seat at Edinburgh.

Metamorphic rocks are those sedimentary deposits which have been so altered and changed in character by the action of heat, sometimes combined with enormous pressure, that their original bedding and the organic remains which they contained have been entirely obliterated, their ingredients being rearranged as crystalline products. To this class of rocks belong many of the granites and other quartzose rocks, mica-schists, slates, marbles, and serpentines. Syenite, which is a species of granite, so named from having been found at Syene, in Egypt, appears as a metamorphic rock in Charnwood Forest, Leicestershire, where it alternates with slates, forming a series of stratified rocks which have been altered by the intrusion of a molten mass forced up from below.

Granitic rocks, whether of eruptive or metamorphic origin, have all a very similar chemical composition wherever they are found, silica invariably predominating, and forming from 67 to 75 per cent. of the mass, alumina being in the proportion of from 13 to 19 per cent., lime from 1 to 3 per cent.,

potash from 3 to 5, soda from 2½ to 6 per cent., and oxide of iron, upon which the colour chiefly depends, varying from 1½ to 6 per cent., the red kinds containing more iron than the lighter coloured. The specific gravity of granites averages 2·66, so that a cubic foot weighs about 166lb., and a cubic yard 2 tons, or about twice as much a yard of coal. The granite of England is only found in large masses in Devon and Cornwall, a few isolated patches of it occurring in Leicestershire, and in the Lake district of Westmoreland and Cumberland. The granite of Devon has been worked on Dartmoor at High-Tor, King's-Tor, Hingston Down, Blackenstone, and at Fremator near Tavistock; it is of a greyish colour and generally porphyritic, having large embedded crystals. London Bridge is built of Dartmoor granite. In Cornwall we find several varieties of granite, which serve as excellent building material; that quarried at the Cheesewring, near Liskeard, is light-coloured, with white crystals of felspar, and has been largely employed in London for building Westminster Bridge, the Thames Embankment, London Docks, the tomb of Wellington in the crypt of St. Paul's Cathedral, and other works. The granite obtained from Penryn and Lamorna has been much used for docks and bridges in London, Birkenhead, and Plymouth, and for fortifications at Chatham and Portsmouth. In the neighbourhoods of Penzance, Falmouth, St. Austell, Lostwithiel, Charlestown, St. Ives, Helstone, and Padstow, much excellent granite is quarried for building purposes. A porphyritic granite has been found at Calstock, Lanlivery, and Luanllian, a block of which was employed to form the sarcophagus of the Wellington Monument in St. Paul's Cathedral.

The syenitic granite found at Mount Sorrel, in Leicestershire, is very hard and expensive to work; some of it has a warm rose tint, which renders it suitable for ornamentation. In the Lake district at Shapfell and Wasdale-Craig, near Penrith, a handsome porphyritic granite is extensively quarried, having a rich reddish-brown crystalline base, with large flesh-coloured crystals of felspar imbedded, and is capable of receiving a fine polish. Patches of granites and porphyry are found in several parts of North and South Wales, protruding through the Silurian and Cambrian strata; it is chiefly quarried for paving purposes.

In Scotland the granitic rocks prevail over all others, especially in the mountainous regions of the northern counties, where they form the basis of the Grampians, extending from Peterhead and Aberdeen on the east coast to Ben Macdui, Ohan, and Fort William on the west. From Ben Nevis the granite is found running northwards through Inverness to the Moray Firth, and occurs in irregular masses about Sutherland and Caithness. It forms a large portion of the Isle of Mull, Arran and other islands on the west coast, and is found in the southern counties of Dumfries, Galloway, Kircudbright, and Wigton, where its veins pierce the Silurian rocks. The principal quarries of Aberdeenshire are in the neighbourhood of Aberdeen, Peterhead, Aboyne, and Inverury; those of Peterhead being chiefly noted for a red granite of close texture and great hardness, which is obtained in large blocks, and is much used for ornamental purposes, as it receives a high degree of polish; it appears to be of eruptive origin. A finely crystalline granite of a light red colour is obtained at Carnegie, and grey granite at Dancing-cairn, Rubislaw, and Tyrbagger, which is considered to be a metamorphic rock of older date than the Peterhead granite. In Kincairdine the granite is quarried about Banchoory, Cove, and Nigg; and in Perthshire at Aberfeldy and Breadalbane. The county of Banff also contains much granite, of which there are quarries at Marnock; and

at Portsoy, on the north coast, Serpentine is obtained for ornamental purposes. In Inverness there are granite quarries at Stratherrick, Fingask near Beaully, and in the island of Berneray. The island of Mull is noted for its beautifully marked granite of a reddish tint, which is highly prized for architectural work, and was employed in the columns which support a portion of the Holborn Viaduct. In the Isle of Arran we find two kinds of granite, one a fine-grained stone suitable for architectural work, and the other a coarse-grained material. A grey porphyritic granite is largely quarried in Kircudbright at Craignair, Creetown, Dalbeattie, and Newton Stewart, which has been much used for buildings and docks about Birkenhead, Liverpool, Newport, and Swansea. In the county of Wigtown the granite is quarried for building purposes at Glenluee and near Wigtown.

Metamorphic rocks abound in several parts of Scotland, being found on the west and north-west of Argyre, and in the counties of Inverness, Ross, Sutherland, and Caithness; they form the lofty mountains of Ben Nevis, Ben Lomond, Ben Ledi, and Ben Lawers, and extend along Loch Tay, Loch Long, and the Caledonian Canal; they are also found at Inverary, Callander, and the Trossachs, Rannoch, Glenlyon, Fortingal, and the Mull of Cantyre. The basis of these rocks is generally a material called "gneiss," which is similar to granite in chemical composition, but differs from it in structure, appearance, and origin, having a laminated arrangement of its particles, and containing crystals which appear to have been worn round by the action of water and confusedly aggregated. It is never eruptive, or found in veins piercing other rocks, and the quartz, felspar and mica frequently alternate, as if the granite had been broken down and rearranged in separate beds of quartz rock, mica-schist, and clay-slate. Gneiss forms the western shores of Ross and Sutherland, and also is found at Culish, near Avoch, on the eastern side of Ross, near the Moray Firth, where it is quarried for paving. Some of the grey granites of Aberdeenshire also appear to be of metamorphic character.

Serpentine is a metamorphic rock, often classed amongst marbles, which it resembles in appearance but not in composition, and is highly prized for ornamental purposes on account of its variegated colours, chiefly red and green, and the fine polish which it is capable of receiving. It differs, however, very greatly from true marble in its chemical composition, being a hydrous silicate of magnesia and containing from 38 to 40 per cent. of silica, with from 34 to 59 per cent. of magnesia, with oxide of iron in larger or smaller proportions, according as the colour is more or less red. It is chiefly developed at the Lizard, in Cornwall, where it is obtained in every variety of colour, and is easily worked and polished. The green Mona "marble," found at Holyhead, in Anglesea, is also a serpentine. This material is also worked in some parts of the north of Scotland for ornamental purposes.

Marble, or crystallised carbonate of lime, must be included among metamorphic rocks, as it is generally a limestone which has been altered and crystallised by the influence of heat. In England the marbles are chiefly found in the Old Red Sandstone or Devonian strata of Devonshire, and in the Carboniferous Limestone of Derbyshire. The marble quarries of Devon are extensively worked, since blocks of considerable size and great beauty of colour can be obtained from them; those found near Plymouth are generally grey, with white and yellow veins, red marble being also procured in smaller quantities. Red marble is obtained near Totness, and green or rose-coloured marbles at Kitley Park. Black and white marbles are quarried near Bury Pomeroy, and also in some of the northern parts of the county. In Derby-

shire marbles of various colours, as black, blue, grey, and russet, are procured about Ashford, Allport, Bakewell, Buckland-Holow, and Derby. Marbles are also found in almost all geological periods, and wherever igneous rocks have come near enough to limestones to produce crystallisation. Thus we have the Purbeck marble of the Upper Oolitic period, which is a fossiliferous limestone, and has been partially crystallised without obliteration of the fossils; the marble of Carrara, in Italy, has also been shown to belong to the same epoch. In the Wealden we find a hardened limestone which can be polished, and is known as Sussex marble, being locally used for decorative purposes.

Slate must undoubtedly be classed among metamorphic rocks, as, although its chemical composition resembles that of ordinary clay, yet it has been so altered by pressure and heat that all its original bedding and fossils have been obliterated, and a new stratification, termed "cleavage," introduced. This material belongs chiefly to the Devonian and Old Red Sandstone series, or to the Silurian and Cambrian rocks, which were described in a former article. The following summary will place before our readers the order in which the several geological series follow one another, and the kind of building materials that each of them yield, as well as the localities in which they are chiefly developed:—

Geological formation.	Building Materials.	Localities.
Tertiaries	Sand, gravel, clay, brick-earth, cement-stones	Thames Valley, Middlesex, Surrey, Essex, Herts, Sheppey, Hants, Dorset, East Yorkshire, West Lancashire.
Chalk	Lime, whiting, flints, building stone	East Yorkshire, Lincoln, Norfolk, Cambridge, Herts, Bucks, Oxon, Berks, Wilts, Dorset, Hants, Sussex, Surrey, Kent.
Gault	Clay for bricks, drains, tiles, terra-cotta; occasionally building stone	Cambridge, Oxon, Berks, Bucks, Norfolk, Wilts, Dorset, Isle of Wight, Kent.
Greensand	Sand, gravel, freestone, sandstone, limestone, rag	Surrey, Kent, Beds, Berks, Sussex, Dorset, Wilts.
Wealden	Clay for bricks, tiles, &c.; sand, sandstone, limestone	Sussex, Surrey, Kent, Dorset.
Oolite	Limestone for lime and building, marble, flags, slates, clay for bricks, &c.	Portland Island, Dorset, Wilts, Oxon, Bucks, Northampton, Rutland, Lincoln, North-East Yorkshire, Somerset, Gloucester.
Lias	Hydraulic lime, building stone, clay for bricks, &c.	North-East Yorkshire, Lincoln, Leicester, Northampton, Oxon, Worcester, Warwick, Gloucester, Somerset, Dorset, Glamorgan.
New red sandstone	Sandstone and limestone for building, flags, landings, blue and red bricks, tiles, drain pipes, &c.	Derby, Leicester, Stafford, Warwick, Worcester, Yorkshire, Lancashire, Cheshire, Northumberland, Cumberland, Gloucester, Somerset, Salop, Devon.
Magnesian limestone	Lime, building stone	Yorkshire, Durham, Notts, Derby.
Coal measures	Sandstone for building, flags, landings, slates, firebrick, clay for bricks, tiles, terra-cotta	Yorkshire, Lancashire, Durham, Northumberland, Gloucester, Monmouth, Derby, Stafford, Worcester, Leicester, South of Scotland.
Millstone grit	Sandstone for building, flags, roofing slates	West Yorkshire, Lancashire, Northumberland, Durham, Derby, Warwick, South Wales.
Mountain limestone	Lime, building stone, marble	Somerset, Devon, Gloucester, Salop, Monmouth, Leicester, Derby, Westmoreland, Cumberland, South of Scotland.
Old red sandstone and Devonian	Flags, lime, red and grey sandstone for building, slates ..	Various parts of Scotland, Salop, Gloucester, Monmouth, Hereford, Somerset, Devon, Cornwall, parts of South Wales.
Silurian	Sandstone and limestone for building, flags, slates, hydraulic lime	Wales, Hereford, Gloucester, Worcester, Monmouth, Stafford, Lake District, parts of Scotland.
Cambrian	Slates, sandstone, flags, limestone, lime	North Wales, Pembroke, Salop, Worcester, Leicester, Cumberland, parts of Scotland.
Igneous rocks	Granite, porphyry, gneiss....	Devon, Cornwall, Leicester, Westmoreland, Cumberland, large part of Scotland.
Metamorphic rocks	Serpentine, granite, syenite, marble, slate	Cornwall, Devon, Derby, Wales, Scotland.

ARCHITECTURAL ASSOCIATION.

At the fortnightly meeting of the Association, held on Friday, the President, Mr. H. L. Florence, in the chair, Messrs. W. S. Skinner and J. D. Webster were elected as members. Mr. PAGE, hon. sec., announced that the next "visit" would be made on Saturday afternoon, the 5th April, to three houses erected from Mr. E. W. Godwin's designs, for Messrs. Gillow, on the Chelsea Embankment, and that afterwards some of the studios of which Mr. Godwin had

recently told the members would be examined. Mr. HAYES, sen. hon. sec., announced that the sub-committee on the balloting question had agreed to a report, and that a special meeting of members would be held on Friday, the 18th April, to consider the desirability of altering the rules.

THE SCHOOL OF ST. LUKE, AT GHENT.

Mr. W. H. JAMES WEALE read the following paper descriptive of this school: My acquaintance with Belgium extends back to 1849. At that time there was no public interest whatever in architectural matters. Whenever any new building was erected, or any old one restored, the local papers uniformly lavished the most extravagant praise on the authors of the work. The only point that occasionally excited remarks of a different nature was the cost of these works. From 1849 until 1858 the only criticism of Belgian architecture that had appeared in the country was contained in two pamphlets by an English architect, then resident in Bruges, Mr. Thomas Harper King, with whose "Study Book of Medieval Architecture" many of you are doubtless acquainted; these related more especially to the new church of St. Mary Magdalene, at Bruges, the plans of which were considerably modified in consequence. In his translation, or rather adaptation of Pugin's contrasts, to which he made considerable additions, were some very just remarks on modern Belgian work, but at the time of publication these excited little attention. In 1858 I commenced the publication of a series of critical articles on the restoration of public buildings of the country. These drew some attention, and when, in 1860, the Royal Commission on Monuments was reorganised, I,

though a foreigner who had but recently settled in the country, was named a member of the Provincial Committee of West Flanders. Hoping to awaken public attention to the real nature of the so-called restorations, I seized the opportunity of the first general meeting of the Royal Commission at Brussels in 1861 to read a memoir on the restoration of the public monuments of the country. This memoir raised a regular storm, not only in the architectural world, but in several of the leading journals, and for several weeks I carried on a paper war with some half-a-dozen opponents. Of the seventy-two

members of the Commission, two only, like myself members of provincial committees, thoroughly espoused the line I had taken up, whilst about a dozen more gave me their more or less partial support. The Central Commission of Brussels, and the entire body of Government architects, became, of course, my bitter opponents. The two members who were with me were the Baron John Bethune, of Ghent, and Jules Helbig, of Liège. The former of these two gentlemen, years before, had one day, while copying the well-known picture of the "Elevation of the Cross," by Van Dyck, in the Church of Our Lady, at Courtray, been accosted by Welby Pugin. The young Bethune became his disciple in the church and town, listened, at first with some astonishment, to the English architect's remarks and criticisms, the points of which awoke a sympathetic echo in his mind, and between the two there sprang up an intimate friendship, which led to M. Bethune's taking up the idea of devoting his life to art. He came over to this country, studied glass-painting and metalwork with the Hardmans, and furniture and architecture with Pugin. He became the Pugin of Belgium, and has for many years not only designed and carried out a number of buildings, ecclesiastical and domestic, but has designed and directed the execution of a vast amount of articles of furniture in stone, wood, and metal, and himself designed and executed a large amount of stained glass. There is no living architect in Europe whose work resembles Pugin so much as his. My other adherent was M. Helbig, an artist, who, after studying painting in the Düsseldorf Academy, had gradually taken more and more to study the Mediæval paintings of the Low Countries, and to imitate with growing success the works of the best artists of the fourteenth century. For three people who met once a year to carry on a struggle with a powerful body like the Central Commission, and at the same time to contend with local opposition with any great chance of success, was out of the question. At last we determined to try and form a society composed exclusively of Mediævalists, and in September, 1863, we founded the Guild of St. Thomas and St. Luke for the study of Christian art and the propagation of its principles. This guild meets every year in some town, either in Belgium or in one of the neighbouring countries. The session lasts a week; the mornings are devoted to the examination of the monuments and works of art of the locality and neighbourhood, the evenings to reading papers and discussions, partly on the buildings and objects examined in the morning, and partly on some particular art question proposed at the previous meeting. It was by the guild that the Great Loan Exhibition of Ecclesiastical Art was got up and carried out at Meehlin in 1864, and which, owing to its taking place in connection with the Catholic Congress, did more than anything to propagate a taste for Mediæval art among both clergy and laity; the chronological arrangement of the specimens of church vessels and furniture there exhibited having been adopted with the especial view of showing the superiority of Mediæval art. The smaller loan exhibition of Bruges of 1867 was also got up by the guild, and this and the annual meetings in different towns brought recruits to our cause. Our views had gained ground, but those of our number who were architects or designers had the greatest difficulty in getting their ideas carried out. Designs put into other hands were modernised and classicised in their execution, and we felt that this would continue to be the case as long as art workmen received their education in the academies, all carried on according to the Government system. In 1864 one of our guild members, who, as a brother of the Society of St. Vincent of Paul, took an active part in the direction of a patronage for young workmen, found two boys who very much wished to learn drawing. The idea struck him that he might introduce this branch of instruction with good result; and having obtained the assent of the committee, he commenced a drawing class, for which he himself prepared the models. Other boys soon joined it, and the class increased little by little. Those members of the guild who resided in Ghent were naturally interested in the work, and promoted it, some by pecuniary aid, others by teaching. In 1869 it was determined to remove the class, which had greatly increased, from the patronage, and to constitute it a separate work, but still under the auspices of the Society of St. Vincent of Paul. The regular direction of

the class, henceforward known as the School of St. Luke, was confided to the Brothers of Christian Doctrine, and in 1870, when it was opened, in rooms of its own, 110 pupils were admitted. In 1871 the rooms were enlarged, a library and a collection both of casts and antiquities commenced, whilst, in addition to the class teaching, a course of lectures on symbolism was given. In 1872 the average number of pupils attending the classes held every evening had increased to 160, and the attendance at a special class, held on Sundays for those whose occupation hindered them from frequenting the evening school, to seventy. A series of lectures on construction were given this year by M. Arthur Verhaegen, who, after having passed his examination as civil engineer before the Government jury with the highest distinction, had adapted the profession of architect. In 1875 the buildings now occupied by the school were commenced. They are red brick, in the Flemish Domestic style of the fifteenth century, and were designed by pupils of the school. The interior is adorned with a simple polychromatic decoration. They were opened in 1876, in which year the evening attendance rose to 200, and the Sunday attendance to 100. The art collection received a very valuable addition in the shape of a number of drawings of articles of mediæval furniture bequeathed to the school by one of its earliest founders and friends, M. Florimond van den Poele, designer of the Convent of Vive, near Bruges, and of the manor-house of Scheldere, whose special talent for designing metalwork had led us to expect great things from him, when his useful career was closed by death at the age of forty-three. In 1877 the new buildings were enlarged. There are now in the evening school 350 boys, and in the Sunday class 120. In 1878 a school of St. Luke was commenced at Antwerp by M. Belpaire, engineer; M. Hendrickx, a pupil of Leys, and the author of the fine series of the "Stations of the Cross" in the cathedral and in the church of St. Joseph at Antwerp; M. Baeckelmans, architect of several remarkable churches; M. van Ryswyk, goldsmith and metalworker—all members of our guild. But this school is not under the care of the Brothers of Christian Doctrine. Another school was established at Tournay, under the management of Brothers trained at Ghent, aided by two members of our guild—M. H. Desclée and M. Cloquet, and a fourth at Lille. I hope that before the close of the present year a fifth will be in working order at Liège. I should have much liked to have been able to have put before you specimens of the pupils' work during each year of the course, which occupies seven years. This, however, was not possible, but I have here the set of models—fifty in number—which form the first or elementary series. The method adopted differs from that generally used in Belgium. The objects are in white outline on a black ground, easily seen at a distance, and intended to be reproduced on a slate or blackboard—a better system for beginners than that of drawing on white paper. The object is to form the eye of the pupil as quickly and as easily as possible by enabling him to see at once the defects in his work, so that he may himself try and improve his copy without waiting for the master to correct it. The classes in the school at Ghent are now complete; they include architectural drawing and construction, ornamental drawing and carving, figure drawing and painting, the complete course in each class extending over seven years. The regular daily direction is confided to the Brothers of Christian Doctrine, who are aided by members of the guild, the general supervisor and director being its president, M. John Bethune. I now wish to call attention to another institution carried on in a similar spirit, but the special aim of which is to form art workmen. About a mile from the town of Ghent, on the road to Courtray, in a small village named Maltebrugge, is an orphanage for boys, built and endowed by a wealthy cotton manufacturer of Ghent, M. Joseph de Hemptinne. It is a large quadrangular brick building, erected from the designs of M. John Bethune, with an elegant and spacious chapel, the chancel of which is richly decorated. The fittings and furniture throughout the entire establishment are in the mediæval Flemish style. Economy has been closely studied, and everything, with the one exception of the altar and chancel of the chapel, is extremely simple, but far more solid than the general run of fittings in institutions of this class, yet, owing to the careful attention given to every detail, the general effect is extremely

good, and even casual observers, after having gone through the buildings, come away impressed with the grandeur of the general effect. The orphanage contains over 300 boys, almost all sons of ordinary labourers. It is under the direction of Brothers of Christian Doctrine. The education is of course thoroughly religious, and not at all in accordance with popular current ideas of the present day. Those boys who show no aptitude for art, are, in addition to reading, writing, ciphering, and elementary geography, taught gardening, tailoring, shoemaking, or some other manual labour. But all those who show any disposition, and the proportion is large, are trained to become art-workmen. At the age of from twelve to fourteen very many of them are able to draw from Nature, and show an amount of feeling that is quite remarkable at so early an age. Instead of engaging skilled masters to teach the boys, which would have been expensive, and probably have led to no satisfactory results, a far better system was adopted. Two brothers, of the name of Blanchaert, one a stone carver, the other a carpenter and wood carver, were indemnified by M. de Hemptinne for removing their workshops from Honsden to the immediate proximity of the orphanage. Blanchaert, the stone carver, is a well-informed but quaintly simple peasant. Thanks to my late regretted friend, Sir John Sutton, Blanchaert in his younger days travelled over great part of Europe, studying the choicest specimens of Mediæval sculpture. He was one of the first to join our guild. In his workshop are now some fifty boys and young men engaged in carving statues, reredoses, pulpits, fonts, &c. In his brother's workshop are some fifty more, who make every description of furniture, from the simplest stool to the most elaborately-carved credence or cabinet. The plan pursued has turned out advantageously to all concerned. The masters, who formerly could not depend on the regular attendance of their men—on Mondays, for instance—and were affected by strikes, can count on regular attendance on every working day, whilst to the boys the advantage of working for a long number of years under the same direction is immense. In other ways, too, they derive special benefit. The wages they earn are paid to the institution, a certain sum being deducted for their keep, as also a percentage for buying off those who may have the misfortune to be drawn as conscripts for the army; the remainder accumulates, and is given to them on leaving the orphanage when they are grown up. There is also a workshop of decorative painting under the direction of M. Ad. Bressers. A foundry for works in brass and other metals has now been at work three years. Here lecterns, tabernacle doors, candlesticks, and other articles in latten, are turned out in all respects equal to old work. A bookbinders' shop has also been established, and a smiths' forge for works in wrought-iron is in contemplation. The whole colony leaves a decidedly favourable impression on the mind of the visitor, carrying him back in thought to the life and manners of the good old times of the Middle Ages. These schools have been started and carried on by men who believe that exclusivism, that is to say, the exclusive study of Christian models, is the only way to arrive at a regeneration of art. And so Classical and Renaissance, or as we prefer to call them, Pagan and Paganised Christian art, are rigidly excluded. Not only that, but in these schools the attention of the pupils is exclusively directed to Christian art of the north-western part of the Continent. All ancient art was the natural outcome of the people, and by an attentive study and analysis of its characteristics we can arrive at a clear idea of their religion, morals, and manners. Indian and Egyptian, Greek and Roman art are all alike in this respect. When Christianity permeated and changed society, there gradually grew up a new art which went on developing itself in a regular and logical manner, until its progress was arrested by the so-called Renaissance. These schools aim at reviving the traditions of Christian art, and for this reason exclude all that is antagonistic. For although in classical models there is doubtless much grandeur and a great deal of beauty, yet even in the best Greek art you will seek in vain for a single type of the two fundamental virtues of regenerated Christian society—humility and chastity. Where faith and morals are wanting there can be no hope of ever attaining the degree of perfection which our ancestors reached in the Middle Ages, far less of surpassing them, for art, according to the definition of the great

St. Thomas Aquinas, is nought else but the manifestation of beauty, and beauty is the splendour of the glory of God revealed in His creatures. Christian artists should be guided by this teaching, which explains the antagonism between the two schools: the Christian school which draws men towards the supernatural, towards their Creator; and the realistic school which drags them down towards creatures. The one seeks for beauty in Nature, and tries to reproduce its works with the greatest perfection; the other rises higher, and, looking to the source of eternal beauty, tries to derive some rays of glory from it. To become Christian artists we must commence by being thoroughly Christian. In the carrying out of this first principle lies the secret of the vigour, strength, and influence of the schools of St. Luke. Many eyes are now fixed, and many hopes founded on them, which I feel sure will not be disappointed. I began by saying that twenty years ago Belgium was, in art matters, behind England in every respect. I will end by saying that, in one respect at least, she is now ahead, in having schools founded on true principles.

Mr. G. H. BUCHAN proposed a vote of thanks to Mr. Weale for his novel and too brief paper. Anyone who had been in the Low Countries, and had criticised the character of the modern architecture, must have felt the need of such a society as the one he had organised. Bad as our restorations might be, England had never attained the mean atrocity of those carried out in Belgium, and specially those undertaken by the Government. At Bruges the town-hall had been recased and completely spoiled, and it was not the only instance of the kind in that town. In many cases in the churches Gothic work that was not even decayed was replaced by modern copies. He could bear testimony to the unwearied efforts of Mr. Weale for many years past to bring about a better state of public opinion, and believed that but for those exertions architectural affairs in Belgium would have been even worse than now.

Mr. ASTON WEBB, in seconding the motion, remarked that Mr. Weale's school was evidently special and exclusive, but seemed to have had good results in training up skilled workmen. Everything appeared to be kept from the members of the guild except Gothic architecture, and that being so, the education could hardly be deemed complete. Would Mr. Weale say that a Medieval carver would have been better for knowing nothing of Greek work? His own opinion was that a general course of styles was the first essential to success in architecture. The question arose how far was it in accord with the spirit of the present day to try to bring up a school of workmen to carry out carving as in Medieval times. For skill in modern work it would be better, he thought, to teach the workmen the study of the carving of the styles which succeeded Gothic, and which more nearly approximate to our own day.

Mr. WEALE said he did not intend his Christian artists to study Indian or Egyptian architecture, for it would be of no help to them, nor did he urge them to copy any style directly but to go to Nature. If the Medieval spirit and mode of study had been continued there would now have been but one style in this country. In restoration one must imitate the details of the work to be restored, but in building a modern church an endeavour must be made to show that it is new, and to give it fresh expression. He could say a good deal about Belgian art of the present day, but as he had only just left the country, he felt it would not be right to do so. He thought that in the town of Bruges he had obtained an alteration of the system of putting a false wooden cornice to every house, and also had set the example, since pretty generally followed, of sweeping the layers of whitewash and paint from the old brick houses.

The PRESIDENT, in putting to the meeting the vote of thanks, said that there were some defects in societies such as Mr. Weale had founded which he must advert to. One of those, that of the exclusive devotion to Medieval work, had already been referred to, and it would in time, he believed, prove a mistake. From the orphanage near Ghent a number of young workers would be sent forth who would find that in the greater number of new buildings going on their only style was not at all wanted. The novelty of the scheme would be lost in a very short time, and the style would degenerate into mere mannerism. There was also a want of a higher

class of teachers than the two village brothers, who, however zealous they might be, were very incompetent for the work of instruction.

THE INSTITUTE PRIZES, 1880.

THE conditions and subjects of the prize list for 1880 have just been published by the Royal Institute of British Architects. Candidates for the Pugin Travelling Studentship, who must be between 18 and 25 years of age, are required to send in their applications and testimonials together with a select number of their drawings and sketches on or before the 23rd January, 1880. All sets of drawings and essays sent in by competitors for the medals and prizes offered by the Institute, must be sent in on or before January 30th, 1879, and must be distinguished only by a motto, and accompanied only by a letter sealed with a blank seal, and having on the outside the same motto as that attached to the drawings or essays, inclosing the author's name and address.

The Soane Medallion and, subject to certain conditions, £50 will be awarded to the author of the best design for a Fine Art Museum for a large provincial town. The building is to be isolated on all sides, and its principal front is to face an open square. The ground floor is to be chiefly devoted to sculpture, coins, &c.—a portion only having a top light—with two or three rooms for curators. On the first floor are to be placed the picture galleries, lighted by skylights only, a fine art library, and a room for engravings. The ground-floor should be raised some three or four feet above the level of the street, and areas should be formed around part of the building, to afford ample light to the basement, in which the surplus collections are to be stored, and works of art received and unpacked. Provision is to be made in the basement for refreshment rooms, as well as for retiring rooms for ladies and gentlemen respectively; and a residential set of rooms for the porter is to be provided in the basement. The site to be occupied by the building and its areas should not exceed 15,000 feet superficial. The drawings required will be, ground and first floor plans, principal elevation, section through the galleries, section through the staircase, each drawn to a scale of 8ft. to one inch; perspective view, and a portion of the principal elevation drawn to a scale of 2ft. to one inch. The further award of £50 will be given to the successful competitor, upon arrangements being made for his going abroad for a period of six months, in order to pursue his architectural studies, within two years after receiving the medallion.

The Tite Prize of £30 will be awarded to the author of the best design in the Italian style for a mausoleum. The plan is to be that of a Greek cross with a dome in the centre, the interior diameter of which is to be 35ft. The drawings required are a plan, an elevation, and a section, each drawn to a scale of 4ft. to the inch, and one sheet of details on a scale of 2ft. to the inch. Careful adaptation to English climate and modern ages will, the Institute Council intimate, be considered in the award. This and the Soane competition are open to all members of the profession under 30 years of age.

The Grissell Gold Medal is to be awarded for drawings illustrating the design and construction of the groining of a church, width of nave 30ft. A plan, longitudinal and transverse sections, each drawn to a scale of 2ft. to the inch, are stipulated for, and perspective diagrams, showing the jointing, may be added; but the joints of the masonry must also be carefully shown in the geometrical drawings. Colour may be used, but only for the purpose of showing the construction and distinguishing different materials.

The Silver Medal of the Institute, with five guineas, will be awarded for the best illustrations drawn from actual measurement (with dimensions figured both on the general and detailed drawings) of any important building—Classical or Medieval—in the United Kingdom or abroad, hitherto unpublished in that manner. A town or country house, erected between the years 1600 and 1750, is suggested as a subject worthy of illustration, but any of the following buildings may, however, be taken if more convenient to the competitor:—Kelso or Dunblane Abbey, Cashel Cathedral, or any monastic building in Ireland, St. David's Cathedral, Entrance Gateway, Middle Temple-lane, Steeple of St. Magnus the Martyr, London-bridge, Steeple of

Newark, Notts, Long Melford Church, Suffolk, or the north-east transept of Beverly Minster. The drawings must not exceed six in number. They must consist of at least one plan drawn to the scale of 8ft. to the inch, or, in the case of very large buildings, of 6ft. to the inch; also of one elevation and one section drawn to the scale of 8ft. to the inch, with details drawn to a scale of 2ft. to the inch, the profiles of mouldings being given 1-11th full size. The elevation and details are to be in outline only; the plans and sections are to have only the sectional parts hatched or shaded. Perspective drawings may also be sent, and they may be etched in Indian ink or tinted in sepia. The jointing of masonry must be carefully indicated, showing mode of construction and materials used. Competitors must send, with their finished drawings, the rough sketches plotted on the spot. This competition is open to all members of the profession without limitation.

The Essay Competition, which has been a failure during the last few years, is again opened, but in addition to the Institute Silver Medal, the sum of ten guineas is offered for the best essay on the subject of "The Architecture of London in the Sixteenth Century," the same subject as that suggested last year, except that the period to be treated ranged from the sixteenth to the eighteenth centuries. Each essay must be accompanied by suitable illustrations, and the competition is open to all competitors without restriction as to age.

PICTURES FOR THE ACADEMY.

MESSRS. PILGERAM and LEFEVRES have had on view at their galleries in King-street, St. James's-square, a few paintings intended for the forthcoming Royal Academy Exhibition that possess more than ordinary interest. Mr. John Smart, R.S.A., is represented by two landscapes of remarkable power. One entitled "Far from the Busy World" sustains Mr. Smart's well-achieved skill as a painter of broad and vigorous effects. The scene represents Scotch moor with cattle and water in the foreground. The ruggedness of the moor, and the heavy cloud are happily suited to the artist's broad and energetic handling. His "Drummond Hill, Perthshire," is one of those impressive views of mountain that meet us in the grand scenery of the Scottish Highlands. The light thrown across the mountain is skilfully managed and the effect of height and distance enhanced by the introduction of a bird on the wing, which catches the light. In the foreground the painting lacks solidity and tone. Miss Henrietta Browne's "Le Ducat" is a portrait study. An old man, apparently a Jew and curious, dressed in a long coat, with cap, is busily engaged turning over his collection of coins and plate. In one hand he holds a coin, which he is examining through a glass. The face, hands, and general drawing are excellent, and the artist has succeeded in producing a well modelled, richly toned, and delicately painted subject evincing a thorough mastery of the figure. Perhaps, the most striking painting on view is Mr. W. E. Lockhart's "Gil Blas, and the Archbishop of Granada," representing the archbishop in his scarlet robes, standing on a landing, with sternness on his face, rebuking the hero of Le Sage, who, cap in hand, dressed in the yellow Court dress, descends the steps. The wealth of tone, light and shade, the expressive cast of features in the old and young man, and the rich costumes, add a dramatic force and charm to the incident told by Mr. Lockhart with so much reality. "Frère and Sœur," is the title of a small cabinet picture, by Mr. Edward Frère. Its interest is centred in a humble interior, in which a little boy is engaged holding a skein of wool for his sister. The tale is simply told, and homely, and Mr. Frère's softness of touch, perhaps, adds to its charm. We cannot admire the drawing of Sir H. Thompson's "Grand Canal, Venice," but as an amateur's work, we at once overlook any technical qualities, and can appreciate the art feeling displayed. L. Alma Tadema, A.R.A., is to exhibit, we understand, several pictures which Messrs. Pilgeram and Lefèvre will have on view during the next few days. We believe one is entitled "A Hearty Welcome," another, "In the Time of Constan-

The first stone of the new spire to St. Peter's Church, Bournemouth, was laid on Tuesday weeks

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ILLUSTRATIONS.

KINGSTOWN TOWN HALL.—THE WINDSOR AND ETON ALBERT INSTITUTE.—EOANE MEDALLION DESIGN FOR A HOUSE FOR THE LEARNED SOCIETIES.—DESIGN FOR LACE CURTAIN.

OUR LITHOGRAPHIC ILLUSTRATIONS.

KINGSTOWN TOWN HALL.

The foundation-stone of this new building was laid during November last year, the design having been selected in competition in the autumn of 1874. To-day we publish a view of the building from the Crofton-road. Mr. John L. Robinson, of Great Brunswick-street, Dublin, is the architect; and Messrs. Meade and Son are the builders. The contract was taken at £12,340. The building will contain a court, with witnesses', judges', barristers', and jury rooms, and clerk of the peace offices. The township offices comprise board-room, town-clerk's offices, surveyors', rate-collectors', and sanitary offices. The large assembly-room is 75ft. by 41ft. 6in., with retiring and cloak rooms. The building is faced with chiselled Dalkey granite, and has Bath stone and red Runcorn dressings. The work is to be completed within two years.

THE WINDSOR AND ETON ALBERT INSTITUTE.

The foundation-stone of the above building was laid on Friday last by Prince Christian. The plans—which were selected in open competition—are by Messrs. H. F. Bacon and E. Ingress Bell. The building has a frontage of about 70ft., and consists of three stories, comprising a great hall for public entertainments (with artistes' rooms in connection therewith), lectures, &c.; a library, reading-room, and ladies' reading-room; a museum, art and science class-rooms, committee-room, care-taker's quarters; stores and warming-chamber in the basement, and the customary accessories. The main entrance is in the centre of the façade, the reading-room being on the right hand, and the library and ladies' reading-room on the left; immediately in front of the visitor the great hall is entered by two ample doorways, between which it is proposed to place a bust of Her Majesty the Queen. The great hall is 66ft. long, 33ft. wide, and 25ft. high, and will accommodate 500 seats, exclusive of the gallery over the entrances. The principal front is designed in the style of the 15th century. It is being executed in red brick, with dressings of a warmly-tinted freestone, and will be embellished with carving, sparingly introduced. In the centre of the *premier étage*, and on a pedestal in a carved and canopied niche, a statue of the Prince Consort is intended to occupy the place of honour. Mr. Woodbridge, of Maidenhead, is the contractor for the works.

EOANE MEDALLION PRIZE DESIGN, 1879, FOR A BUILDING TO ACCOMMODATE FOUR LEARNED SOCIETIES.

The accommodation provided is in accordance with the instructions, and is similar for each of the four societies, with a lecture-hall in common. Examining one of the sets: The library is fitted for 5,000 volumes, and has a gallery round, supported on coupled swept trusses. It is principally lighted by the windows in the bays, which are above the wall space, which is valuable for book-shelves; the ceiling is to be formed by semicircular arches, abutting on the sides of bays, which carry the flanks of bays above the roof. The bays are also arched across, and the ceiling of panelled plaster follows the lines of these arches. A librarian's room is attached. The reading and writing-rooms adjoin, and are separated by a screen. They each have bays, and are planned to obtain as much light as possible, and to be easy of access. The principal lavatories and cloak-room are in mezzanine, over the subordinate rooms of the ground-floor. The entrance is from the courtyard by the doorway, a detail of which is given, and has w.c. and cloak-room attached. The staircase rises immediately from the entrance. On the ground-floor are the council and committee-rooms, secretary's and clerks' offices, with separate entrance, cloaks, and w.c. The lecture theatre is seated for an audience of 300, and is provided with ample entrances both from the courtyard and externally. A detail of one bay of the elevation is furnished. The ceiling is to be waggon-beaded over each limb of the cross, and flat, with deep cove over the crossing. Caretakers are provided for in the basement. There is also an attic story with dormers, which break the roof. It was felt that the courtyard plan would lend itself most readily to equality in the arrangement of the four sets, and to efficient lighting and privacy. The style chosen was Renaissance, the chief intention of which was to do without an order, and to obtain some originality without the eccentricities of the later developments. The drawings required were eight, of which the perspective and sheet of details are illustrated.—W. R. L.

DESIGN FOR A LACE CURTAIN.

The illustration given this week is from a design by Sidney Smith, a student of the Nottingham School of Art. It was exhibited among the national competition works, at South Kensington, last year, and gained a silver medal. The fabric is intended to be made on a lace machine. The style is technically known as "Guipure d'Art," and is a reproduction, as far as can be done by machinery, of the 16th century hand-made lace, known as "Puato in Aria."

THE AMALGAMATED SOCIETY OF CARPENTERS AND JOINERS.

WE have received the Nineteenth Annual Report of the Amalgamated Society of Carpenters and Builders. It congratulates the members that although the past year has been one of commercial depression and disaster, resulting in severe suffering to trade organisations, and heavy taxing on the resources of the society, yet it is still in a sound financial condition, and the diminution of accumulated capital has been comparatively trifling. During the year thirteen new branches have been opened and six were closed. The total number of members at the close of the year was 16,574, being 255 less than at the end of the previous year. Notwithstanding that the largest and most costly strike ever known of the trade took place in the first five months of the year, yet the income was only diminished by £632 14s. 1d. from those of the previous year, the total receipts being £41,598 14s. 3d. The expenditure amounted to £44,476 14s. 7d. showing a loss on the year of £2,878 0s. 4d. A valuation of the buildings and other property of the Society shows that the assets are worth £76,166 6s. 5½d., or £4 11s. 11d. per member. In unemployed benefit £10,504, or 12s. 8d. per member was paid, the largest sum per member since 1871, and for trade privileges including strike pay, arbitration, and legal expenses, £12,292 or 11s. 10d. per member. "Attempts to reduce wages are now being made," the report notes, "in many of our northern and midland towns, and while in most of our larger towns and cities employers are honourably adhering to their agreements, and giving due notice of their intention to reduce wages, in other localities they are taking every possible advantage of

the depression of trade, and are giving only a few days' notice of reductions to workmen from whom they have received as many months' notice whenever an advance of wages has been desired. Such conduct is unwise in the extreme. The tide will turn some day, and their conduct will not be forgotten. We have been endeavouring to impress on members the desirability of giving to their employers ample notice of their intention to claim advances in wages, to enable them to finish existing contracts without loss and to provide in new ones for the increased cost of labour. In some towns all efforts in this direction are being neutralised by the short-sighted policy of the employers, who will eventually mourn over the consequences of their own folly." Reference is also made to the Government Bill dealing with the liability of employers for injuries to workmen, which it is suggested is not intended to be passed. The secretary, Mr. Prior, says he has no hope of obtaining a satisfactory measure from the present House of Commons, and urges the members to make their power on this question felt at the next general election.

COMPETITIONS.

CITY OF LONDON SCHOOL.—Fifty-three architects have sent in designs for the proposed new building for the City of London School.

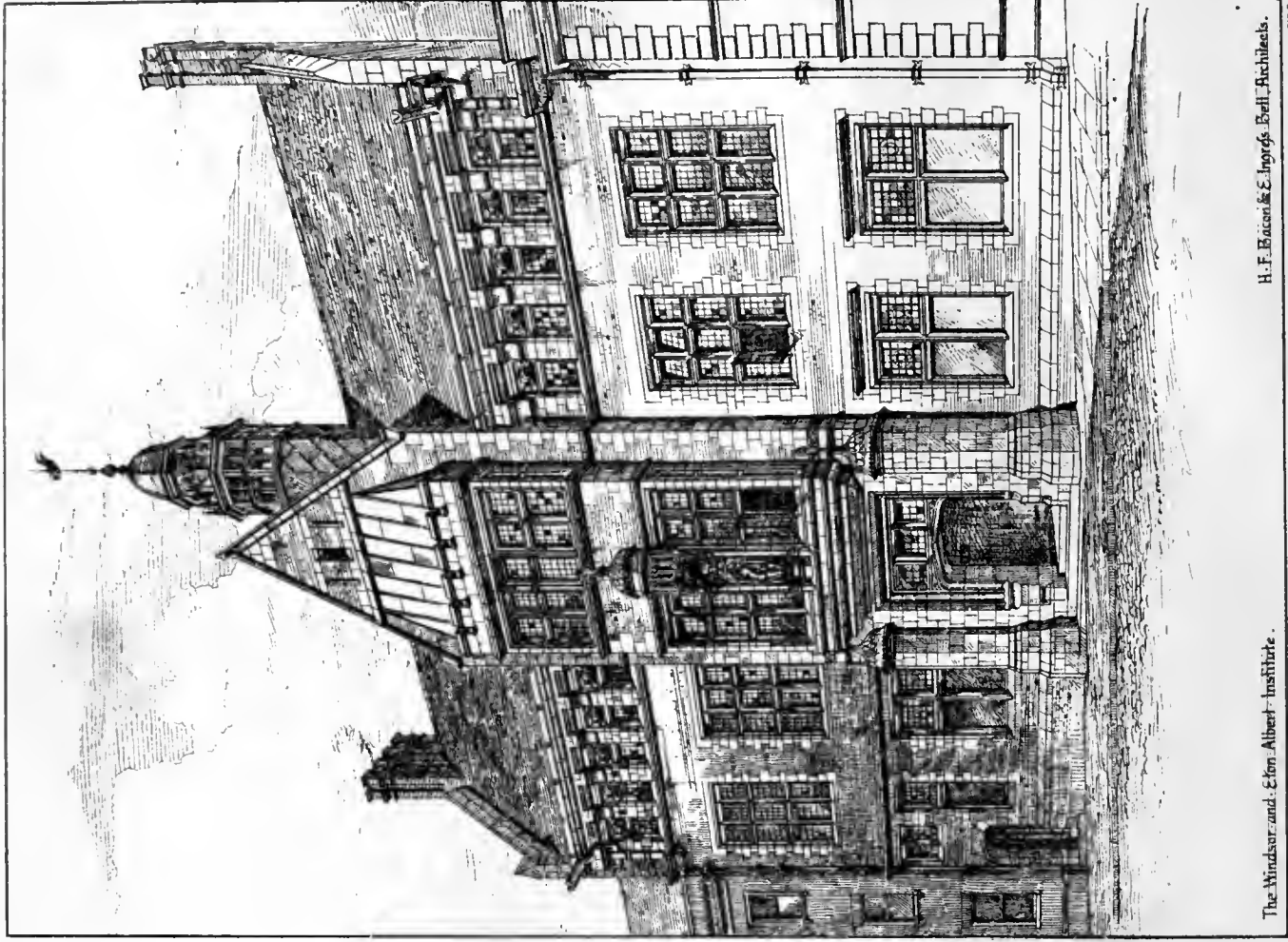
HARVEY TERCENTENARY MEMORIAL.—The models for the statue of Harvey which it is proposed to place at Folkestone will remain on view in the picture-gallery of the South Kensington Museum until the evening of to-morrow. The models are three in number, distinguished by the letters A, B, and C, and were reviewed by us on p. 244. The scale is three inches to the foot. It is intended that the statue shall be of bronze and the pedestal of granite. At a meeting of the sub-committee held on Monday at the Royal College of Physicians, Sir George Burrows, M.D., in the chair, it was decided that the commission for the statue should be intrusted to Mr. A. Bruce Joy, who is the designer of the model marked B. About £1,800 has already been subscribed, and £200 more will be needed to defray the cost of the memorial.

IPSWICH.—The town council of Ipswich recently received seven plans for the adaptation of the Public Hall, so as to serve as a corn exchange without unfitting it for the purposes to which such a building is usually devoted. These were sent in under the several mottoes of "Tria Juncta in Uno," "Bona Fides," "Exeelsior," "Economy," "Utility and Economy," "Grosvenor," and "Postulata." A special meeting of the town council was held on Wednesday last, when in accordance with the report of a committee, the premium of fifty guineas was unanimously voted to the plan of "Tria Juncta in Uno," and upon opening the sealed envelope, the author was found to be Mr. Horace Cheston, 1, Great Winchester-street Buildings, London, E.C. The estimated cost of the scheme is £3,400, but it should be added that the town council have not yet decided whether to alter the public hall as suggested, or to build an entirely new corn exchange and public offices at the rear of the town hall.

NEWTON ABBOTT.—At a meeting of the shareholders of the Newton Abbott Coffee-Tavern Company it was decided that the tavern should be erected in Market-street, from the designs of Mr. Jones, architect, of London, which had been selected by the Directors. The opposition, which was weak and frivolous, sprang from motives of jealousy.

On Tuesday week, at the Anthropological Institute, Sir Charles Nicholson, Bart., read a paper upon "Rock Carvings." These are to be found in various parts of the harbour of Port Jackson, New South Wales, representing the human figure, kangaroos, whales, &c. One, a whale, was fully thirty feet in length. The remarkable circumstance about these carvings on the carboniferous sandstone is their evident antiquity. Earth has gathered upon the sculptured surface of sufficient depth to sustain forest trees.

An oil painting of the late Alderman W. G. Ward has been hung in the Dawson gallery of the Castle Museum, Nottingham, in the establishment of which Mr. Ward devoted all his powers. The portrait is the work of Mr. S. Redgrave. Among other recent additions to this museum are three cases of Indian embroidered saddlery, armour and weapons, purchased at the late Paris Exhibition.



The Windsor and Eton Albert Institute.

H. F. Bacon & E. Inghs, Bell Architects.

Photo Lithographed & Printed by James Ackerman, 6, Queen Square, W.C.

THE RESTORATION OF TEWKESBURY ABBEY.

IN view of the reopening of Tewkesbury Abbey in September next, a public meeting was held in the library of Lambeth Palace on Friday afternoon. A number of drawings and views, including a series of water-colour sketches by the late Rev. J. L. Petit, of Lichfield, were hung in the room. The Right Hon. Sir Michael Hicks-Beach, M.P., occupied the chair, and in opening the proceedings urged that the abbey had especial claims on the country at large for reparation and maintenance. As a rule when parish churches needed restoration there was no special difficulty in raising the means in the neighbourhood, for they were not generally much larger than suited local requirements, nor required greater funds than could be raised in the immediate district. Our cathedrals were known far and wide as great national monuments, but were felt to be in a peculiar sense the property of the diocese or county in which they were situated, and in all cases that responsibility had been cheerfully accepted and borne. But the case of Tewkesbury Abbey was very dissimilar to either of these; it was of a size far beyond the needs of the townspeople, while it had no cathedral body, nor funds, nor the widespread fame and interest which attached to the centre of a diocese. Special means had therefore to be taken to bring the absolute necessity for its restoration before the nation at large, and to attract general sympathy and interest. As to "restoration" he was very conservative. In the first place he would say, Keep a building in repair, even remove any of the discrepancies which have been added to it, but do not add any of your own fancies; and treat all you find there soberly and reverently. Too often these rules were broken in so-called restorations, but no fault of that kind could be found at Tewkesbury. He believed the abbey was safe in the hands to which it had been intrusted, and that the restoration would be carried through in a conscientious spirit.

The Rev. H. ROBESON, vicar of Tewkesbury, read the report of the Restoration Committee. It stated that very considerable progress has been made towards the restoration of this, the largest abbey church in England, since the meeting held in March, 1877, when a National Committee was formed to co-operate with the Restoration Committee at Tewkesbury. The works done since that meeting include the removal of all plastering and whitewashing from the walls, pillars, piers, and vaulting of the nave, a task nearly finished, and which has in places revealed work of a highly artistic character. The ornamentation of the nave vaulting is now being proceeded with under the personal care of Mr. T. Gambier Parry, to whom this part of the work has, with the approval of the architect, Mr. J. Oldrid Scott, been entirely confided, while a stone pavement laid on the ancient level discloses the full proportions of the massive Norman pillars, and gives greater dignity and effect to the whole interior. The floor of the transepts, chapels, &c., has been concreted and repaired, and the two ancient chapels adjoining the north transept (until lately erroneously known as the Chapter House), and which have for long been in a ruinous condition and cut off from the church, are being also re-roofed and otherwise restored. The Rev. C. W. Grove, of Tewkesbury, has presented an oak eagle; while Mrs. B. T. Moore, also of Tewkesbury, has undertaken the cost of a new font. A striking feature has been added to the eastern end of the church by the generosity of Earl Beauchamp, who has at his own sole cost restored to its ancient position the old altar-slab, mentioned by Dingley in his "History from Marble" as the largest in the kingdom. This slab, divided in half, has for generations served for seats on either side of the north porch. It is now mounted upon a massive oak frame, and is regularly used at the celebration of the Holy Communion. Earl Beauchamp also included in his gift two handsome altar-coverings. The interesting Clarence Vault, containing the skulls of the famous Duke and Duchess whose name it bears, has also been repaired. Other works have been carried out, or are in a fair way towards completion, including necessary repairs to the roof of the fabric, a thorough system of drainage surrounding the building, the restoration of the north-west porch and gates, which form the

principal entrance, and the improvement of the approaches generally. Much costly work still, however, remains to be done in the reparation of nearly all the interior fittings of the church, as well as much-needed and considerable external repairs. One important item has engaged most careful attention, viz., the enlargement and rearrangement of the organ, for which it is proposed to erect an organ-loft across the north transept-arch and above the north choir stalls. The execution of this work has been intrusted to Mr. Henry Willis, of London, whose estimate for the alterations and improvement (retaining as much of the ancient organ and its case as is possible) amounting to £700, has been accepted. The amount of payments already made, and for existing contracts, reaches the sum of £7,911, to which must be added the estimated cost of restoring the ancient stalls, the enlargement and fixing of the organ, the decoration of the nave vaulting, the levelling of the churchyard and other external repairs, in all £1,225, making a total of £9,136. The subscriptions hitherto received amount to £8,694, to which may be added a conditional promise of £500 by the Vicar and his sister, making a total of £9,194, thus leaving a balance of only about £58 at the disposal of the committee. The committee have carefully refrained from contracting any debts, or from entering into any contracts the expenses of which they were not prepared to meet, and therefore appealed with more confidence for further aid from the public.

Earl BEAUCHAMP moved "That this meeting, having heard the report of the Restoration Committee detailing the works which have been carried out during the past two years, desires to express its entire satisfaction with the progress which has been made, and cordially invites the co-operation and aid of all who are interested in a work of such great national importance as the careful and judicious restoration of the largest existing abbey church in this country." The work had, he said, been frugally and judiciously carried out; no other restoration of like extent had been carried out for so little money.

Lord SUDELEY, high steward of Tewkesbury, seconded the resolution, which was carried unanimously.

Mr. REGINALD YORKE, M.P., proposed that the names of the following gentlemen be added to the National Restoration Committee:—Rev. Canon Barry, Messrs. Thomas Blashill, A. W. Blomfield, H. C. Coote, E. B. Ferry, J. F. France, S. W. Kershaw, Bowes A. Paice, R. B. Prosser, J. P. Seddon, and Wm. White; and that a London sub-committee for the purpose of collecting the funds required for the completion of the work be also formed. Mr. Yorke compared the state of the abbey in 1865, before the restoration was commenced, and at the present time, and said there were grounds for congratulation in the changes effected in the appearance of the abbey. The resolution was seconded by Mr. BLUNT, and agreed to.

Mr. JOHN OLDRID SCOTT read a report on the abbey and the works that are being carried on under his supervision and from his designs, opening by expressing his acknowledgments to the Restoration Committee for the confidence they had reposed in him. It was his earnest intention to pursue the course laid down by his father, and to act in the same spirit of true Conservatism by which he was always inspired, and which in this case is, Mr. Scott significantly added, happily shared in to the fullest extent by the committee themselves. The Abbey is built mainly in two styles—Norman of a very plain kind, and a beautiful variety of Middle Decorated. The Norman abbey was founded early in the 12th century, and consisted of a long nave with aisles, transepts united by a grand central tower, and a choir, also with aisles, terminating in an apse, surrounded by an ambulatory, from which no doubt projected chapels, as they did also from the eastern walls of the transepts. The two chief characteristics (both of which still remain) must have been the grand central tower, richly arcaded, and surmounted as it then was by a wooden spire, and that which yet gives it especial individuality, the remarkable western front, the central part of which is occupied by one vast arch, extending from the ground to the roof, recessed in seven bold orders. This was no doubt originally filled in with a number of Norman windows, but of these we have now no record. The present appearance of this front is much injured by the loss of the gable which rose

above it till the 17th century, when all the high roofs were unhappily swept away, to the great loss of the building. Internally the abbey, which was in those early days exceedingly plain, had a curious feature (which it possessed in common with Gloucester and Pershore) of remarkably tall columns and arches in the nave, contrasting with very low ones in the choir. The building continued as its Norman founders left it for some 200 years, when early in the 14th century an astonishing change took place. In the nave this was confined to the insertion of tracery windows throughout, and the substitution of stone groining for the flat or coved wooden ceiling, the same being done in the transepts. In the choir, however, a far greater alteration was effected. The ambulatory was first taken down and rebuilt farther out, and from it were projected the most beautiful series of chapels to be found in this country, except indeed at Westminster. All of these now remain with the exception of the Lady Chapel, which was on a far larger scale than the others, and which from the precious fragment of its west end still existing, must have been a building of extreme beauty. The date of these works must have been early in the century. Immediately afterwards the whole of the choir was pulled down, the Norman columns only being left, and rebuilt in the richest variety of the prevailing style. A lofty clerestory was erected, consisting of some noble windows of the finest design, which are still filled with their original stained glass. The groining, too, was of the most elaborate description, and the whole of this part of the building within and without is of almost unequalled elegance and picturesque beauty. The new walls were of the same height as the old ones, but the roof was arranged slightly lower than before, so as to allow of the addition of the beautiful parapet—now, unhappily, almost ready to crumble away. At this time and subsequently the eastern part of the building was further enriched by a magnificent series of Chantry chapels and monuments. These alone are sufficient to place Tewkesbury in the very first rank among our great churches in point of historic interest. Two more peculiarities relating to the interior which distinguish Tewkesbury Abbey as it has come down to us remain to be noticed. The marked contrast between the noble simplicity of the nave and the exceeding richness of the eastern portion is the first. This is very striking, and the skill with which the two are brought into harmony by groining of a somewhat similar character being continued throughout the whole length is worthy of especial observation. The other feature to which I would allude is the unusual proportions of the interior. No other building of this nature gives such a remarkable impression of breadth and expanse. This is no doubt due to the height being in such a small ratio to the width; but it is the breadth of the building which strikes the observer, and not its want of elevation. Reference should be made to the exquisite thirteenth century work adjoining the north transept. There was at first a Norman apsidal chapel here, which was rebuilt in the thirteenth, and again in the fourteenth century; but just beyond this, in a very unusual position, viz., at the extreme north-east angle of the transept, there still remains a most beautiful little building, dating from the commencement of the Early English period, though with subsequent alterations. This can be shown to have formed the chancel of the small church, the nave of which ran across the north front of the transept. It has been conjectured with much probability that it was erected to form a Lady Chapel for the use of the parishioners. The design of its nave can still be traced with some accuracy, and it must have been a feature almost unique and of the greatest beauty. Should its restoration ever become possible, it would be indeed a charming addition to the Abbey, and one, I cannot doubt, of great utility. But I must proceed to describe the works we have in hand and those which are proposed. The cleansing from modern plaster and whitewash and the repair of defective stonework, spoken of in the Committee's report, refers only to the interior of the abbey. What is of special interest here is the treatment of the vaulted ceiling. The bosses of the groining when first uncovered showed signs, although not very distinctly, of their ancient decoration, and it was at the time determined to restore them. The result, however, was unsuccessful, and the treatment was stopped

after two bays had been so dealt with. The carving of the bosses throughout the roof is of the highest value and interest, the subjects of the central range consisting of scenes from the *Life of Our Lord*, while the two side rows are occupied with angels bearing censers or playing upon musical instruments. Nothing can exceed the artistic feeling displayed in these sculptured bosses; but, from their being in most cases hardly more than sketches, it quickly appeared that any treatment of them in full colour tended only to obscure their design, and to emphasise their incompleteness. So much was this felt that for a considerable time it was the opinion of M. Gambier Parry and of myself that it would be best to attempt no decoration whatever. The greater part of the ceiling was, therefore, left plain, but the effect from below was by no means satisfactory, and at length Mr. Parry proposed a mode of treatment which he has now carried out in a portion of the groining. I desire to express my great admiration of the skill and judgment shown in this work. The committee unanimously concur in this opinion, and it has been decided that the treatment shall be continued throughout the whole of the nave. The floors of the transepts, ambulatories, and chapels have been made good in all respects. The Decorated chapel east of the north transept is in course of careful reparation, the east of which is being borne by the Provincial Grand Lodge of the Freemasons of Gloucestershire. Some pressing repairs are also being carried out in the Early English chapel to the north of this, already alluded to, but not to the extent of anything like complete restoration. Important works have been carried out in the choir. Of the ancient stalls, a sufficient number remain to complete the back row on both sides of the new arrangement. In addition to these, considerable portions of the 14th century stall backs, or screens, which rose above them, are in existence. It has been decided to restore the stalls to their original position beneath the tower, and to erect above them these ancient screens. Unfortunately, only sufficient length of the latter remains for the north side, and this alone has been ordered by the committee, the funds not being sufficient for the new screen required on the south side. Eventually, a second row of seats must be added for the choir boys as well as book-rests, but at present this part of the arrangement must be temporary, the total expenditure needed for the complete re-arrangement of the choir amounting to between £700 and £800, of which the committee are only able to undertake a very small portion at present. Various proposals have been made as to the choir screen, but the only designs prepared have been for a low inclosure of ornamental character. A wooden model of the most recent design has been made, so that its effect may be well considered. It is my own opinion that this church should eventually possess a high choir-screen, of very open design, but sufficiently elaborate to accord with the ancient fittings. The font at present consists of a base and shaft of Decorated date, carrying a bowl of very mean appearance, probably belonging to the 18th century. A new bowl has been designed, agreeing in style with the ancient part. It will be Purbeck or some similar marble. The font when completed is to be surmounted by a lofty wooden cover of tabernacle work, the design for which has been founded on an ancient fragment of 14th century woodwork remaining in the abbey. Great pains have been taken over the design, which is now being carried out by Mr. Collins, the contractor for the restoration works. A pulpit is much needed, and it is essential that it should be worthy of this grand building. As to the chantry chapels, it appears to me that it would be the wisest course to leave them without anything like complete restoration. Some slight repairs are actually required, and should be undertaken, but nothing beyond this would be desirable. The case of the sedilia is different, these being a necessary part of the furniture of the church. Happily, the greater portion remains. The design is noble and characteristic, and I think it would be well to complete them. The restoration of the clerestory windows really forms a part of the external reparation of the stonework. In proportion to the size of the building, not much work of this nature is necessary, and it would not, I think, be wise to do more than is absolutely wanted. The roof of the south aisle of the nave is, however, in a very bad state, and requires re-tiling, as well as other repairs. As to a reredos, no resolution has been

come to by the committee, although I have prepared a sketch design with a view to elicit opinions on the subject. Considering how the choir is flanked by a noble series of chapels and towering monuments, I feel that it can never look complete until its eastern extremity is occupied by a reredos as dignified as any of them. It would be necessary to give any reredos erected here a considerable amount of local character, introducing among its sculptures figures of those eminent personages with whom the history of the abbey is so intimately connected. The north porch to the nave is now being carefully repaired, and is nearly finished; the very sumptuous iron gates which have stood in connection with it for the last 150 years will be retained, though their level will be lowered. The floor of the nave has now been entirely lowered to its ancient level with a very good effect; the step which we discovered to have marked the position of the ancient roof-screen which separated the conventual from the parochial church, being restored. Finally, a few words require to be said about the organ. The position decided for it is beneath the north arch of the central tower, above the screen forming the back of the stalls. The fine old case will be strictly preserved, a very small addition being made to its lower part to adapt it to its new position. It is of great value and beauty, and from its details must be one of the earliest in the country. Such then is an account of the works either in hand or contemplated. All are of importance and indeed of pressing necessity, but the means at the disposal of the committee compel them at present to postpone a considerable proportion of them. It is greatly to be hoped that the publicity now being given to this great work may lead to substantial help being received.

Mr. GAMBIE PARRY, in proposing a vote of thanks to Mr. Scott for his paper, explained the work he had himself been engaged upon in the nave roof decorations. This vault was, he said, a most interesting specimen of English carving; the roofs of Gloucester, Norwich, and Tewkesbury were the three finest in this country. But this roof was but a series of grand skeletons; it seemed as if the carver had chopped away just as the spirit moved him, leaving it to the colourist to complete the ideas he had suggested. The figures in the bosses were remarkable for their size; the angels carrying all sorts of musical instruments were about two-thirds the size of a woman, and the central bosses, in which were represented the *Life of Our Saviour* from the Nativity to the Majesty, were even larger. In the Crucifixion, the figure is about 3ft. in height, but, strangely enough, the Cross was left for the decorator to fill in. The task he had undertaken of renewing the colour which formerly existed on these carvings was one of considerable difficulty, and concerning it various opinions would be held. That, however, he had experienced before. During the time that he was at work in Ely Cathedral he met a clergyman who, on hearing that he was acquainted with that Cathedral, exclaimed "Oh, there's a horrid fellow daubing over that beautiful building; I wish he might be hung to a lamp-post and cut into a thousand pieces!" Mr. Parry said he was a little amazed at the outburst, but he explained that he himself was the "horrid fellow," and they parted as good friends. At Tewkesbury he had found the greatest difficulty in the work on account of the extreme and necessary simplicity demanded by it. It would be very easy to colour the roof; but to apply the right lines and touches of colour at the best places for effect would demand the exercise of consummate art. There were a few records in the stones of what the ancient treatment resembled, and he believed it was coarse. The difficulty was that any system of high colour—vermilion, gold, and blue—applied to a few points had a tendency to look blotchy, whereas, to be satisfactory, the effect should be one of complete harmony, of perfect peace. The aim of the decorator should be, consecutiveness, proportion, rhythm. In this roof there was a great deal left so vague that one must follow out his own ideas in completion; the nimbuses, &c., had been supplied by the artist, and this rule he had endeavoured to follow, venturing to add a cross in gilding beneath the figure of the Crucified One. Among the instruments borne by the angels were the rebec, shawm (a sort of bass clarionette), psaltery, and bagpipes. There were also a pair of very curious figures, which were declared by one set of commentators to be Fitzhamon, founder of the

abbey, and his wife, but which others thought to be only Adam and Eve.

Mr. AGG-GARDNER, M.P., seconded the vote of thanks, which was briefly acknowledged by Mr. Scott; and the proceedings closed with the usual compliments to the chairman and the Archbishop of Canterbury for granting the use of the library. The visitors afterwards availed themselves of the Archbishop's permission to inspect the palace-chapel and dining-hall, &c.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ARCHITECTURAL FOLIAGE.

WE give this week, in continuation from p. 339, the second part of Mr. J. K. Colling's paper on "Architectural Foliage," read at the meeting of the Institute on the 24th ult., with the subsequent discussion:—

In designing foliage we have chiefly two things to study. Form, and light and shade. In form the first thing we have to decide upon is the leading or setting-out lines of the composition. And whether these consist of the scroll form, the branched, the radiating, or any other lines, they must intersect and divide the space to be filled, in the same manner that the ribs and veins do the surface of a reticulated leaf. No portion must be left unprovided for, and they must harmonise with the bounding or other architectural lines of the work itself. These should be laid out upon a geometrical and somewhat regular and symmetrical plan, and we can but partially obtain any assistance for this purpose from nature. But there are some general ideas that we can gather, such as the scroll lines we see in tendrils and climbing plants, the various modes of branching, the reticulation of leaves, and the radiation of flowers. Architectural foliage should represent natural growth, and not be formed with flowers, fruit, and leaves picked and separated from life. Crooked form, such as we find in nature, must be altered to the tangential or angular, or a combination of both. We should remember also that upright lines represent life, hanging or dropping lines decay and death. Having decided upon the leading lines of our stems, the next process is to clothe them with leaves, flowers, and fruit. Here we may bring to our aid that variety and beauty of form with which nature supplies us so bountifully. As a general rule all well marked and deeply cut lobed leaves are most applicable to carving, such as the irregular lobed leaves of the acanthus, thistle, hawthorn, oak, and the chrysanthemum; radiating leaves, as the horse-chestnut, cinque-foil, vine, and maple; or those which have separate leaflets as the trefoil, rose, ash, and acacia. Perfectly plain leaves, such as the lilac, box, laurel, and olive, are also valuable where simplicity and breadth of form are required; or the complicated can be reduced to their first simple form. Nature proceeds in this manner herself—in one leaf, the *Maranta*, has herself painted the forms of the plain leaf. Leaves mostly assume, more or less, the forms of the geometrical figures. The *Laurestinus* gives that of the vesica. The *Cinearia maritima* is of the same general form, but is cut into deeply rounded lobes, of the same type as the oak. All compound leaves still retain the general forms of the more simple ones, as shown by the rose-leaf. The dock has a leaf of an oval form, found again in the deeply crenate-lobed leaf of the greater celandine. The heart-form is seen in the black bryony and violet, and again in the leaflets of the clover. The main ribs of the leaf of the black bryony assume very beautiful flowing forms, having a strong resemblance to the lines of the Greek-honeysuckle. In the violet, the ribs are quite different, and branch from the midrib, while in the bryony they flow gracefully from the base of the leaf where it joins the foot-stalk. The ground ivy approaches very closely to the circle, and the two sorts of mallow leaves are of the same general contour. The water avens, or *Herba Benedicta*, from which the Early English foliage is said to be taken, gives a very simple trefoil; in late growth it is split into separate leaflets. The clover gives a very perfect trefoil, formed by three heart-shaped leaflets. The terminal point of the leaf of the sow thistle gives the triangle, which is seen again in the young leaves of the ivy. The ivy assumes three typical forms during its growth: the triangle, the square or lozenge, and at length, in its

full development, the pentagon. The terminal leaflet of the cow parsnip approaches closely to the diagonal square. The typical pentagonal form of palmate leaves is shown in the maple and sycamore. The five-pointed form is still retained by separate leaflets, as in the passion-flower leaf, and the cinque-foil. There are two modes of treating leaf-form. One, that of retaining the natural contour, as we find it more especially in older leaves, as in the maple and vine, which start off with an abrupt angle or curve from the leaf-stalk. The other mode is that as seen sometimes in young leaves, as in the hawthorn, where the leaf flows tangentially and smoothly out of the foot-stalk. Most of the conventionalised architectural foliage is in this manner, as in the early English. It is not necessary to follow natural leaves literally—they may be simplified; modified to make them more symmetrical, or altered to fill any particular form; or their outlines may be changed by adopting various cuttings, or differently formed lobes. If we take, for instance, the most common of all leaf-edgings, the serrated, we are not bound to the number we use in a leaf; we can reduce them to three, five, seven, and so on for the entire leaf, just as it may suit our purpose; or we can subdivide them as in the hawthorn, separate them by lobes, as in the *Grevillea Acanthifolia*, subdivide as in the creeping crowfoot; or lastly, separate into distinct leaflets, as in the delytra. The same rule applies to other edgings, and to the dentated and rounded forms, which may be also subdivided. Even the pointed forms may be softened into the rounded. What is done with leaves may also be done with flowers, or leaves may be substituted for petals. Variety of form may be also obtained by the introduction of insects, birds, animals, and the human figure, which frequently give additional interest to the composition with the happiest result. The light and shade of foliage is a matter of vast importance, and one that is seldom sufficiently considered. We can obtain but partial assistance in this study from nature. Carvers usually overdo the shadows on the surface of leaves. If they are engaged upon Gothic work, they will tumble the surface about like the sea in a storm, after the manner of the later Gothic carving, until all beauty of outline is lost. If it is a Classic leaf they are working upon, they will groove and hollow it up until the whole surface is full of lines. In my working drawings I always indicate the modelling of the leaves, which I usually keep very simple, but it is very seldom that I can get the carver to adhere to the simplicity aimed at. When carving is placed upon a ground, as in a panel, the treatment of that ground in high relief is of the utmost importance. In low relief the carving depends more upon outline, and not so much upon light and shade, because such works are usually placed near the eye; but in high relief the ground should be treated like the background of a picture, and the darkest and most intense tones be produced by it; the most brilliant lights should be obtained by the convex surfaces of the foliage, and the hollows be trusted to for the half-tints. With this scale of light and shade the artist has to work much in the same manner as a painter would if he were painting in monochrome. It is, therefore, important how the lights and shadows are balanced and distributed. If the shadows on the leaves are made too broad and deep, or too numerous, they must reduce the amount of light, and the value of the shadows on the ground will be destroyed, because they amalgamate with those on the surface. The conventional treatment of architectural foliage depends more upon the skilful management of the light and shade than upon almost anything else. In adapting, the forms of leafage may be followed very closely, but its geometrical distribution and the treatment of the light and shade are the principal means of transforming it into conventionalised architectural ornament. The amount of undercutting is another point which requires great consideration. Some carvers take an infinity of trouble, and laboriously undercut every part; but this is a mistake. Some portions do not require to be undercut at all, but should be made to unite and melt away into the ground itself, in order to soften the edges of some of the deepest tones, and to lose the outline of the minor parts, so as to raise the value and sharpness of others. By this mode of partial undercutting, also, we see that the work is actually a part of the panel, and not laid in. Where the work, however, is much raised from the ground it should invariably

be undercut, so as to avoid thick, clumsy edges to the leaves. We obtain many valuable hints for shadowing from the backs of natural leaves, as they are usually more convex than the fronts. The dried horse-chestnut leaf gives a very excellent suggestion for raising the centre of the leaf surrounded by a hollow, often of great use in practice. The artist also requires to study the general balance of his light and shade, so that one is not too important for the other. As a general rule he usually errs by creating too much shade. In this country we require strong contrasts, and if the work is internal, such as in a roof or grained ceiling, he can hardly make his light and shade too strong. The nature of the material in which the enrichments are executed is another matter requiring thought. A dull, heavy sandstone needs a very different treatment to a bright white crystalline marble, and deal has to be handled differently from oak, and box again, differently from either. Square block carving looks remarkably well in rough, coarse-grained sandstone; it has the advantage of never getting clogged up with soot, and it always shows to advantage when placed at a considerable height. For great heights very little surface carving is necessary, and foliage will frequently look all the better for being left perfectly square and flat, so as to give, according to the distance, the utmost value to the difference between the light and shade. What is crude and unfinished when near the eye will appear bright, sharp, and sparkling when placed at the height for which a due calculation has been made for the effect intended to be produced. Immense labour may be often saved by properly considering this point when designing or carving ornament to be placed at a considerable elevation. One way in which the amount of carving or intricacy of parts can be studied for various heights is this. Let the carver take his position on the ground in a position from which the enrichment can be best seen, after having set up a model at the height at which it is to be placed. Let him then with a pencil, stretched at arm's length, mark off upon it the size of the enrichment as seen from that point. If he puts this size upon paper, and begins to sketch in all the parts of his ornament as he intends carving it, he will soon perceive what to omit. If the height be considerable he will find that he cannot draw in all the work, and that he can improve the sketch by omitting half, or perhaps three parts of it. The principles upon which leaves are divided in nature are continually being intermingled, although the power of nature is so great that each individual plant retains its own characteristic form. Not so in art. After a considerable practice and study of nature, you will draw your leaves without immediate reference to nature, they will be in accordance with her laws, but one form will intermingle with another, until you will scarcely know yourself for what leaf you intend it. That, however, need not distress you, as your object is not to copy nature, but to work upon nature's laws. Thus your simple lilac leaf may become ternate, as in the Hepatica; doubly ternate, as in the creeping crowfoot; triply ternate, as in the celery; until, when you desire it, you arrive at the intricacy of the parsley, which is still upon the triple principle of division. Nature carries out the principle even upon the same plant—as in the ivy—where the leaves next the flower are perfectly plain and undivided, the young leaves upon the leaf stems are ternate, which further develop in the older leaves into a pentagonal form. The pentagonal principle is again carried on, from the ivy, through the maple, which has subdivided lobes, the vine and hop serrated, the cinque-foil where it becomes five distinct leaflets, and to the horse chestnut, in which it arrives at seven leaflets. You need not necessarily follow any particular leaf. One point more must be noticed—the foreshortening of finials and other objects when placed at a height on a building, and the necessity of proportioning them so that they appear to the eye of the desired height when in their elevated positions. Many sculptors make proper allowance for this when executing statues to be placed on the parapets and pediments of lofty buildings, but it is seldom attended to for minor objects. Some of the Early French finials are very ably proportioned in this respect, and here is an example, in which a due allowance has been made for foreshortening, in a finial from the interior of the Lady Chapel at Ely. It is from the upper canopies, where it is placed at a considerable height. It is greatly elongated beyond the ordinary proportion, and the berries

above the lower range of leaves are raised, and stand clear above them, although the modelling of the leaves is rather in excess; the ribs upon the surfaces are omitted. This elongation is not only observable in the finial, but also in the canopy itself, which is of a much more lofty proportion than any of those nearer the level of the eye. There are ample opportunities for introducing foliage into architecture, and abundant materials for the purpose of the artist in nature, which have never been exhausted—so that the source is a vast and boundless one, containing a never-ending variety of beautiful form. Nature, however, is so prolific, and so wayward in her manner, that a mere glimpse at a few leaves or flowers, or a mere picking up of a natural form here and there, is worse than useless. It is the principles that we have to search for, and these are hidden under every variety of form and manner. There is only one way to detect nature's secrets, and that is to sit down patiently to draw one form after another, until we at length arrive at a complete scale of all nature's variety of form—of her regularity and irregularity—of her geometrical uniformity, and of her apparent utter want of plan or design in her manner of growth. We see that throughout all her works she never by any chance imitates herself—for no two leaves, even upon the same branch, were ever yet found precisely alike—and yet the same forms are continually running throughout nature, until we may almost imagine that nature does nothing more than reproduce herself, and the casual observer can see but little variety in all her forms. Whether we examine natural forms in this country, or whether we obtain them from the most distant quarters of the earth, we can see nothing new, nothing fresh; nature is still at work upon her old forms, at one time on a gigantic scale, at another upon a microscopic one; but when we search below the surface, we arrive at certain art principles upon which nature works, and which alone are of any worth to the true artist. There is more truth in the words of the poet than he himself knew, when he said—

All nature is but art, unknown to thee;
All chance, direction which thou canst not see;
All discord, harmony not understood;
All partial evil, universal good.

Mr. HADFIELD, of Sheffield, proposed a vote of thanks to Mr. Colling, with most of which he cordially concurred. The architect who insisted on having all his bench ends carved to a uniform pattern, could not have been a very attentive student of old Gothic work; in our churches there is much variety in the treatment of the ornament, and frequently the decoration has some reference to the dedication of the church, or to local or family history.

Professor KERR, in seconding the vote of thanks, paid a tribute to Mr. Colling's long continued studies and working on carved foliage. It was a subject extremely difficult to reduce to anything like philosophy, and even the author, with all his numerous examples and patient investigations, had not ventured to evolve laws on which to work out the treatment, but led his hearers to nature and there left them. There were one or two points he would like to raise, without differing from the lecturer. One of these was the scale of objects imitated from nature; was it permitted to the carver to vary this or ought he to adhere to the various sizes of the objects copied? It seemed to him that if one took, say, a leaf of parsley, dock, or thistle, or the smaller trefoil clover as a model, he was scarcely at liberty to reduce or enlarge all to the same size. In imitating it was assumed that nature's objects were perfect and her scale was a part of the design. At the same time, various scales might be employed on different architectural works. Perhaps Mr. Colling would overcome this difficulty by regarding the scale of his decoration as conventional, but in going a step further back one might encounter a greater difficulty in assimilating forms one with the other. Another point was that if carvers were to imitate nature in stone, how could they copy natural leaves to a nicety in such a material? It did not seem a substance in which the tissues of leaves and plants could be appropriately reproduced in all their minuteness. Carved foliage should be essentially architecturalesque and conventional in character. In carving on boxwood or ivory the treatment might be delicate and dainty, and natural forms might be copied exactly as one found them; but for ornament to be applied to architecture, conventionalism was of the essential philosophy of the work. Thus the Greeks usually

conventionalised the foliage when applied to buildings. In Mediæval carving, especially of the 13th century, there was an exquisite nicety; it was more *naturalesque*, but still everything was conventionalised, much more so than was usually the case at the present day. He was very glad to hear Mr. Colling condemn all "festoons and swags" for the system on which they were designed was fallacious. Those who were the masters of the Queen Anne style were compelled to use these festoons, and to develop them in red brick—a marvellous instance of what man will do when working upon fallacious principles. No allusions have been made to this, probably because Mr. Colling had kept upon higher ground. Another point of interest was the proper architecturaesque carving upon terra-cotta. There were two principles on which terra-cotta might be ornamented. On one the material was taken from the mould, burnt in the kiln and then treated; on the other it was sophisticated, trimmed, modified, undercut, and otherwise treated in the process of manufacture after it had come from the mould. These two modes of treatment were suggestive of the question whether the material should be regarded as to be cast or cut, and the same query also arose as to plaster-work generally.

The President remarked that the paper was suggestive, but the subject was subordinate in its relation to the work of an architect. The architect's first consideration should be not the treatment of surface, but the general form and proportion, and so to assimilate the features to the character of the building. Mr. Colling had spoken against wasting time upon the study of mouldings and proportions of old work, but the difference between the work of the skilled artist and the mere stucco constructor lay chiefly in the greater care bestowed on his details and outlines shown by the former. Other differences between cultured and uncultured work existed in the greater power to observe natural forms and skill in reproducing the features selected—two qualities not found in constant ratio amongst different workers. He would venture, even pace Messrs. Colling and Kerr, to make some apology for the much-abused festoon. It generally represented flowers not growing, but plucked, and might thus be appropriately hung in panels or placed on pediments. He was not sure that Mr. Colling had been quite consistent in his paper, for he seemed to argue in favour of a natural treatment of foliage in one place, and in another that it should be made more conventional than was usual.

Mr. COLLING, in reply, said there was no necessity to adhere to any set scale in the imitation of natural objects. Nature herself varied the scale in warmer or colder climates, as might be seen in hot-house foliage. Again, one might take a part only of an object as a decoration—a single portion of the parsley-leaf would generally be found better than the whole spray. Neither scale nor form should be followed to a nicety, but every detail should be studied direct from nature, and then broadly conventionalised. The President had rather misunderstood him as to mouldings; he did not object to their being studied or used, but to their being substituted for carved decoration. His chief objection to festoons was that they represented decoration external, and applied to the building, and that they did not form part of the architecture. He did not object to conventional foliage, but to the resuscitation of conventional foliage of other days, whether Greek, Roman, or Gothic; instead of this, let them go back to nature and conventionalise from its forms for themselves.

The President announced that the next meeting would be held on April 21st.

MR. SEYMOUR HADEN ON ETCHING.—II.

THE theatre of the Royal Institution was closely packed on Saturday afternoon by those desirous of witnessing Mr. Seymour Haden's demonstration of the mode in which he etches. The lecturer said he should divide the subject into three parts, and should in turn consider the art itself, its chemistry and its mechanics, the last including its material results.

There are three modes, he said, in which one can deal with a metal plate so as to print from it, viz., those of engraving proper, etching proper, and dry-pointing—a process which may be regarded as intermediate between the other two. Engraving is executed by actual delving into

certain portions of the plate by means of an instrument having a triangular point, and called a burin. In etching a corresponding portion of the plate is removed, not by cutting into the material, but by the action of certain chemical agents known as mordants, which are allowed to act on unprotected portions of the plate. The dry-point process consists in incising lines and afterwards roughening the same by means of a sharp style, without, however, removing any of the surface. My purpose is not only to explain the ordinary process of etching, but also to describe a process which few have heard of, and which still fewer have employed. Ordinary etching consists in drawing upon a plate previously protected by a resinous coating with a needle, in such a fashion as to remove the coating and lay bare a portion of the metal. The needle is not intended to wound the metal, but simply to remove the varnish with which it has been coated. The next operation is to submit the plate to the action of a chemical agent having a strong affinity for the metal—in technical terms, capable of "biting it." This biting can be effected in two ways: either by means of nitrous acid, stopped out from the portions not to be corroded by Brunswick black, or by chlorate of potash in diluted hydrochloric acid. The ordinary process of etching is so troublesome an affair that it may well deter anybody from attempting it. The work is so awkward, and difficult of execution, as to certain classes of minds to prove prohibitive. The plate is first varnished on both sides, so carefully as to completely protect it from the mordant. Then the drawing is made upon it in lines of equal thickness by means of a long needle. When the design is completed it is well-nigh incomprehensible; the strokes in the extreme distance are exactly the same as in the foreground, and none but an adept could make head or tail of the plate. The artist next examines his plate, and, with a brush charged with varnish, lightly covers over, or, as he calls it, "stops out" any lines which may appear to him to be wrong; then he puts his plate—such a one as the one already drawn upon which I have in my hand—into the bath already prepared. In about a quarter of an hour I shall have to take out and examine the plate, and stop out those portions which I think are sufficiently bitten by the mordant, and this must be done at frequent intervals throughout the biting operation to obtain the varied effects of distances. You will understand from this that the process is a most laborious process, and indeed it could not be completed within the limits of an ordinary lecture, so that I could not show the whole in operation. Then, at the end of it all, it will be found that, owing to the imperfect nature of the mordant, the biting has been very irregular, and it frequently becomes necessary to enforce parts of the etching not properly bitten with a stronger mordant. This accomplished, the varnish is cleaned off the plate, and the plate is ready to be printed from. Even now, after all the varnish has been cleaned off, it may be found that the plate has not been sufficiently bitten, owing to the temperature having been too low, or some other reason. In such a case a very delicate process must be resorted to; a dabber, covered with varnish, is applied to the surface of the plate so cautiously as to protect the general face, but not to fill in any of the lines insufficiently bitten; and it may be imagined what a very gentle hand is needed for this. The plate is then returned to the bath and finally re-bitten.

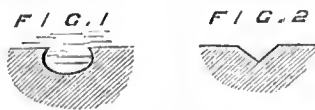
Another process, that which I have the credit of having invented—a statement partly true and partly incorrect—I have ventured to call the "continuous process," in distinction from the one just described—the ordinary or "interrupted process." In this new method the execution of the drawing on the plate is effected while it lies in the mordant bath. The drawing is so carried on that the lines described first shall be the ones requiring to be the most bitten, and the last those that need the mordant action least, so that there is a regular and imperceptible gradation of intensity from the immediate foreground to the aerial perspective. Sometimes it is inconvenient to draw while the plate is immersed in the mordant. This is never the case in the open air or in a room lighted from the side; but it is extremely inconvenient in such a building as this theatre, lighted entirely from a lantern, and in order to demonstrate my process I shall therefore have to avail myself of the aid of artificial light. Under the ordinary process the drawing

is executed in several stages: beginning at the foreground, the etcher works in the middle distance, the extreme distance, and then the sky, biting in each stage with the mordant as he proceeds, and stopping out those fully bitten. The etching lines thus form a series of different planes of depth. But in the continuous method the biting is proceeding concurrently with the drawing, so that each line has its peculiar intensity, and the result is an etching really "coloured" by lines of different thicknesses. The metals used for etching upon are zinc and copper. Steel is used by engravers, but never by etchers on account of the hard and dry line it makes; for this reason it is unpleasant, and therefore undesirable. Copper, on the other hand, is sometimes soft and at other times hard, and that makes a great difference in the value, endurance, and execution of the plate. I very rarely etch upon it, although its use is very common. The line made on steel is hard and inartistic, that on copper is soft, while that on zinc is very flowing and painter-like. The impression from zinc is totally different from that on copper (as may be seen from these proofs hung side by side); the lines are broader, have more colour, and have a more artistic result, although those on copper are undoubtedly more delicate. [Mr. Haden here drew attention to a series of his framed drawings hung on the screen, pointing out that some were etchings on copper and some on zinc, executed by the interrupted and continuous process; some were examples of dry-pointing and others of ordinary engraving.] Zinc is very speedily bitten, so that I shall be able to execute and finish a drawing under the continuous process in a quarter of an hour, whereas, if I drew on copper, it would occupy an hour. Before coming to the room I put a zinc plate into a bath of water, hydrochloric acid, and chlorate of potash, and tried the experiment of drawing for exactly a quarter of an hour to see how far one could get; I found I could etch to half through the middle distance, and with your permission I will continue the experiment. Here, you see, is my bath; at the bottom are four little bits of wax, on which the back of the plate will rest. On this plate, which is already varnished, there are a few marks (although perhaps you cannot see them). The solution in the bath into which I am dipping it is stronger than it would be exactly prudent to use for actual work, but that will render the process both quicker and easier. You will please to imagine that you are looking out of a window at Amsterdam. Immediately in front is the river Amstel; on the left is a row of trees and between the two a road. In order to remove the varnish from the plate I am using a very coarse piece of steel; it does not need a fine point, for the mordant keeps it sharp. Of course the nearest objects must be drawn first, and I will begin with a tree (Mr. Haden proceeded to draw as he explained the operation). Now we will go on to the next tree, and then to the one next to that, each being one degree further back than the one last completed. In the river, are some barks of timber floating about, and on one of them is a man fishing; all these things are useful as proving that it is a river we are looking at, for each must be indicated with a few strokes. In the middle of the river is a boat in which is a mast, and in the boat are two men, and there are one or two posts in the river. The lines composing the road come next, but the road is dusty, and the ruts must be left till later, for they belong in depth of execution to the background. On the other side of the river are some trees forming in fact the middle distance and background, and a few white houses peep out; these trees may be suggested by a few lines, but the windows of the houses must be kept black. There are two or three boats in the middle distance, and by the river some trees with very deep shadows under them, especially between the stumps, which stand out from the shadows. If you listen to my needle you will hear a distinct grating noise; it is being arrested by the action of the mordant, and this is very valuable aid to the etcher; for, one thing, he cannot easily transgress upon a line already drawn, owing to the biting of the mordant. This plate is undergoing the action of what is called "foul biting," the coating of varnish is not sufficient to cover it, and the mordant will act upon the general surface. This accident would be the despair of an engraver, but an etcher rather likes it, as it gives colour and effect to his print. By this time our first plate, done on the intermittent process before I came here, is partly bitten, and you

see that I remove it from the bath, and stop out portions of it with varnish. It represents a country lane, deeply rutted, and you observe I have almost covered it with fresh varnish, all except a post in the middle which I want to stand out, and so I leave this to be further acted upon in the bath. But it becomes necessary for me to describe the chemistry of what is going on. This depends on the biting in of the unprotected parts of a metal plate, by the action and reaction of chemical agents. For copper, we use (a) nitrous acid 33½ parts, and water 66½ parts = 100 parts; and (b) hydrochloric acid 20 parts, and chlorate of potash 3, adding of water 77 parts = 100 parts. We (1) dissolve the chlorate of potash in 38 parts of boiling water, and (2) mix the hydrochloric acid with the remaining 38 parts of cold water, and (3) add the two solutions together. For zinc we use (a) nitric acid 25 parts, and water 75 parts = 100 parts; and (b) hydrochloric acid 10 parts, and chlorate of potash, 2 parts, adding of water 88 parts = 100 parts. The solution is made in the same way as for copper. By experiment the lecturer explained the method of making nitric acid, and added that the action of this agent on copper is extremely uncertain as well as long. The biting-in is really equivalent to the painting-in or technical execution of the picture, while the actual work with the needle corresponds to the art manifestation or poet side of the production of a picture. Now the actual painting-in of a picture is a very serious thing; upon it depends the whole spirit and sense of the work. Some artists have the power of conception, and others only the art of execution; but only in extremely rare instances are both gifts combined. Palmer has both, and so has Merion, but Whistler shows only one; while Herkimer and Hook possess both in a fair degree, and almost every other etcher has only the one quality. Turner had the power of biting-in the line in a manner unlike that of any engraver. In his "Liber Studiorum" the engraver was to finish the plates, but in some cases Turner completed the biting, and in these the work is a model of skill and mastery; every line is distinct, and there is not a line too much. Two or three were drawn but not bitten by Turner. Thus there are two plates of a "Farmyard," both drawn by him, but only one bitten by Turner; and you can hardly believe that the two were executed by the same person, so great is the individuality which resides in the biting-in. Returning to our etching, I may say that etching in a mordant, under the continuous process, is a pleasant process; if you have a low stool and sit in the open air, it is almost like painting on an easel. Nitric acid is always unmanageable—partly on account of varying atmosphere, hygrometric, or meteorological conditions, and partly because of the impurity of the substance. Etchers often find that on certain bright, sunny days, when all other conditions are favourable for his work, the acid will not bite; whereas on a lowery, gloomy day its action is very rapid. The reason for this is the presence of more or less oxygen in the air, assisting or retarding the galvanic action of the nitric acid on the copper. The several reactions I have drawn out as a diagram,* which it would be well for every etcher to copy and study at his leisure.

The third head, that of the mechanics of etching, remain to be considered, and by this term I mean the material results of the process. In Fig. 1, you will see a section of the depression caused in the copper by the mordants. For a time the surface resists the acid, but when it has bitten it, the mordant spreads in every direction beneath the surface, forming a more or less globular cavity; above this is a little pent, or roof of varnished surface, and this plays an

important part in the durability of the plate. Now, with this, let us compare an engraved line (Fig. 2); you will see that the triangular



point of the burin has scooped out an accurate straight-edged groove. You see at once that the burin is a most inartistic instrument; it was never used by Martin Schön or Albert Dürer. Lucas, Vanleiden, and many early engravers employed it, but never invented with it, for they could not. The burin may be suited for reproduction, but has no artistic value. When the printing ink is passed over the surface of an engraved plate, it forms a V shaped line on the paper. The cast of an etched plate is totally different (and I believe this distinction has never before been pointed out). The etched cavity has much more retaining power than the engraved groove, and the surface of the impression is rounded. For these reasons, an engraving has a hard grey effect, while the masses of an etching have a colour and richness of their own. The durability of an engraved and of an etched plate is again very different; from the former thousands of proofs may be taken, but from the latter only a few are obtainable. Why is this? Because, while in each case the wear of the handling, and the pressure of the roller and machine are much the same, grinding down the whole surface of the plates, its effect on an engraved plate is to remove the upper part of the groove you see in section, and consequently to narrow the burin cut. As a consequence, the impression of these lines grows very slowly paler and paler, until at last it has no colour. In the etching, however, the pressure upon its characteristic pents over the holes left by the acid, very soon breaks them down, and the whole of the crater is open, and the result is, that after printing 40 or 50 proofs, you find it has got so muddy that you don't care about it. But, before we close, I must clear off the varnish from our plate, and you will see to what extent it has been bitten. In our next, and last lecture, we will go into the process of printing off our etchings, and we shall have a little press, and print them off in this room.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

KING ALFRED'S SUMMER PALACE.—The excavations in King's Court-yard, at Mudgley, Wedmore, near Bridgewater (where the thousandth anniversary of the peace of Wedmore was recently celebrated), for the supposed remains of King Alfred's Summer Palace, are progressing satisfactorily, under the management of the Rev. Sydenham Hervey. Of late much more of the supposed palace of the West Saxon kings has been brought to light. A wide stone causeway at the north entrance of the palace has been found. Its length is not yet known. A well little less than 30ft. deep has been discovered at the south side of the works. It is supposed that another well will be opened shortly more towards the interior of the building. The excavators are now opening the ground on a wide and long wall, leading from south to north at the west side of the field. The width of the wall varies considerably, and one end of it seems more like a double wall than a single one. The north end of it is not yet reached. This wall is an important discovery, as it somewhat corresponds with the wall at the east end running parallel with it in the same direction. A better plan of the building can now be drawn, and a more exact description given. The masonry in this wall and in the wall of the well is more perfect than any yet found.

Extensive works of restoration and repairs are about to be carried out at the parish church of Shenington, near Oxford, from the designs of Mr. J. L. Pearson, A.R.A., of Harley-street, W. The chief features of the work will be a new roof, new pews in the place of the present high ones, a new vestry and organ chamber on north side of church, fresh stalls and tiling in the chancel, and providing a heating apparatus. Tenders have been invited from selected builders, and that of Mr. Bartlett, of Bloxham, being the lowest, has been accepted at £1,200.

BOOKS RECEIVED.

The City of London Directory, 1879 (London: W. H. & L. Collingridge), is marked by several improvements which add to its value. It has a position as a directory which is unique in the variety and accuracy of the information given, which is absent from any other work of the kind we know of. To City men it has long become indispensable. — *Bevis's Builders' Price Book* (London: H. C. Bevis & Co.) is a guide for estimates, arranged by Mr. H. C. Bevis, whose practical experience as a builders' accountant has again been turned to good account in its preparation. — *A Universal Dictionary for Architects, &c.*, by Wyvill James Christy (London: Griffith and Farran), is to be a "copious vocabulary and practical explanation of the usual terms current in the architectural profession and allied trades." The first part only is to hand. The assumption in the preface that "excepting the Dictionary of Architecture there is no book which exclusively contains in alphabetical order a fair approach to a complete repertory of architectural and building artificers' phraseology" is inaccurate, and the attempt made to supply the want not so successful as might be wished. The dictionary is "copious" enough, but not complete. For instance, it is not possible to give any practical information worth having about abattoirs in the space of eleven lines. More space might easily have been gained on the same page by omitting the twenty lines devoted to the explanation of "Abbreviations," which are of no practical value whatever. We scarcely see, either, why it was necessary, on p. 43, to introduce the word "architectress" merely to tell us at the end of thirty lines that it is scarcely probable "that women will ever sedulously cultivate any architectural talent." — *Familiar Garden Flowers*, by Shirley Hibberd and F. Edward Hulme (London: Cassell, Petter and Galpin), will have its principal value for our readers in the plates, which are designed by an artist who has before contributed to our own pages. — *The Carpenter's Slide Rule: Its History and Use* (Birmingham: John Rabone & Sons), is a cheap and very complete series of instructions useful to builders, carpenters, bricklayers, glaziers, paviors, slaters, &c.

CHIPS.

New steam flour and meal mills were started at Keswick last week. The building is 90ft. by 35ft., and six stories in height, and has been constructed of local red freestone, from the designs of Mr. W. N. Dack, C.E., of Patricroft, Manchester. The machinery is chiefly from Illinois and Hamburg, and is driven by rope gearing in place of the usual upright shafts and beveling. Mr. Dixon, of Penrith, was the contractor for masonry, and Mr. Pattinson, of the same town, for the joinery.

A new aisle is about to be added to Christ Church, Lowestoft, from the designs of Mr. W. Oldham Chambers, of that town.

A stained glass Perpendicular window has been placed on the north side of Great Shelford Church, Cambridge. The principal subjects are the three Graces—Faith, Hope, and Charity—while the tracery is filled with angels and lily foliage. The work was designed and executed by Mr. W. H. Constable, of London and Cambridge.

The new thoroughfare known as the Bethnal-green Improvement, being the last portion of the Oxford-street to Old Ford line of new streets, sanctioned by Parliament in 1872, was opened by the Chairman of the Metropolitan Board of Works on Friday afternoon. The new street is 60ft. wide and nearly 2,000ft. in length, and is carried from near Shoreditch Church to the wide portion of Bethnal-green-road.

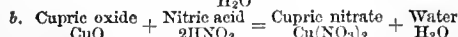
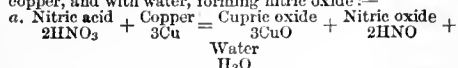
An inquiry was held at Ryde, Isle of Wight, on Wednesday week, before Mr. G. S. Smith, C.E., Local Government Board Inspector, respecting an application from the Town Council for power to borrow £12,000 for the extension and improvement of the esplanade.

Mr. G. E. Street, R.A., has resigned his seat on the council of the Royal Institute of British Architects (of which he is one of the vice-presidents), owing to the large demands which will be made on his time at the council of the Royal Academy during the next two years.

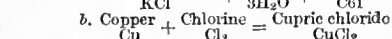
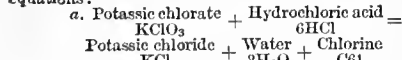
A new chapel-of-ease is about to be erected at Burton-on-Trent, to accommodate 600 people, at a cost of £5,000. Mr. R. Churchill is the architect and Messrs. Lowe and Sons the builders.

Thomas Couture, the French historical painter, died on Monday, in his 64th year. His chief picture, entitled "Romains de la Decadence," figured in the 1855 Exhibition.

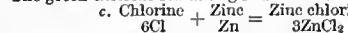
* 1. Reaction of copper on nitric acid in two simultaneous steps. The copper acts on nitric acid, forming oxide of copper, and with water, forming nitric oxide:



2. Reaction of copper and zinc on a mixture of chlorate of potash and hydrochloric acid. "Dutch mordant" may, though simultaneous, also be represented in two equations:



The green chloride remaining in solution. For zinc:



Building Intelligence.

METROPOLITAN BOARD OF WORKS.—At this board on Friday a resolution was passed declaring it desirable that the opening up of Buckingham-street to the ornamental garden of the Victoria Embankment should be carried out by the raising and opening of the York Water Gate, and it was referred to the works committee to suggest the mode in which this shall be carried out. An offer from the French Electric Light Company to supply two more electro-dynamic machines so as to supply 20 additional lights, extending along the Victoria Embankment as far as Blackfriars-bridge, at the inclusive rate of 6d. per lamp per hour, was accepted. Sir J. W. Bazalgette stated, in reply to questions, that the electric light became more feeble if more than a certain number were lighted, but that at present the engine was not working to its full power. It was stated that experiments were being made by the officers of the board, the result of which would be embodied in the report to be hereafter published. A letter was received from the Home Office, transmitting a statement of objections signed by Mr. J. Goodman, as chairman of a meeting of owners of land, and builders, and urged by such meeting against certain by-laws proposed under the Metropolitan Management and Building Acts Amendment Act, 1878; it was referred to the Building Act Committee.

RAWMARSH.—Last week the first school which has been erected by the Rawmarsh School Board was formally opened. The new schools have been erected at a cost of £6,200, and will accommodate 700 children. Mr. J. Platts, of Rawmarsh, is the architect. The schools will accommodate 200 boys, 150 girls, and 350 infants, allowing ten superficial feet of space for each child. The style is Domestic Gothic. They are built of brick, with Hooton stone dressings, and the three main fronts are faced with pressed bricks. Mr. Joseph Brookfield, of Parkgate, acted as clerk of the works.

SOUTHAMPTON.—The corner stone of the new Freemasons' Hall at Southampton was laid last week. The principal elevation of the hall, which is to be in the Italian style of architecture freely treated, is 50ft. in length, the side elevations, facing the Forest-view roadway, extending about 73ft. There will be an ante-room or chapter-room, 26ft. 4in. by 18ft. 9in., with a height of 11ft., its bay windows overlooking the Western Shore. The lodge-room will be 45ft. by 30ft. and 18ft. high, and will be lighted by two lanterns from the roof. There will be a banquetting room, facing Albion-terrace, 38ft. 6in. by 25 ft., also 18ft. high, together with a kitchen, wash-house, pantry, and serving passage. The material will be of white brick in all the exposed parts, with dressings partly in moulded brick, and of stone to the architraves and pediments. The roofs are to be slated and tile capped. The architect is Mr. J. G. Poole, and the builder Mr. S. Stevens, both of Southampton.

By the death of Mr. G. F. Playne, F.G.S., of Minchinhampton, the county of Gloucestershire has lost an archaeologist, botanist, and geologist of distinction. The Gloucester Museum is indebted to him for an excellent collection of flint implements. In collecting materials for one of his last papers—read at the Cottswold Club, on "The Ancient Camps of Gloucestershire"—he visited, and from measurement made plans of nearly every camp in the county.

Mr. J. Louth Clemence, architect, of Lowestoft, has been appointed surveyor to the Kirkley Burial Board.

In our account of the restoration of the parish church of Kennardington, Kent, last week, the Incumbent's name is misprinted as Loft instead of Lobb. The contractors, who have very satisfactorily carried out Mr. Seddon's designs, are Messrs. Bourne and Son, Woodchurch, Kent.

Those interested in the preservation of the Carlisle Tower, Newcastle-on-Tyne, ancient landmark, will be pleased to learn that it is the intention of the Treasury to send down an inspector to examine and report to their lordships upon the question at issue.

A memorial pulpit to the late vicar, the Rev. C. Porter, constructed wholly of English oak from designs by the late Sir Gilbert Scott, has just been placed in the church of Raunds, Northamptonshire.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the **ENGLISH MECHANIC AND WORLD OF SCIENCE**, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation render it the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price 2s. 6d. of all booksellers and news-vendors. Post free 2s. 6d. Office: 31, Tavistock street, Covent-garden W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph advertisement inserted for less than 6s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

TERMS OF SUBSCRIPTIONS.

(Payable in Advance.)

Including two half-yearly double numbers, One Pound per annum (post free) to any part of the United Kingdom for the United States, £1 6s. 6d. (or 6dols. 40c. gold). To France or Belgium, £1 6s. 6d. (or 33s. 30c.). To India (via Southampton), £1 6s. 6d. To any of the Australian Colonies New Zealand, the Cape, the West Indies, Canada, Nova Scotia, or Natal, £1 6s. 6d.

N.B.—American and Belgian subscribers are requested to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance. If the last-mentioned precaution is omitted some difficulty is very likely to arise in obtaining the amount. Back numbers can only be sent at the rate of 7d. each, the postage charged being 3d. per copy. All foreign subscriptions, unaccompanied by an additional remittance to cover the extra cost of forwarding back numbers, are commenced from the next number published after the receipt of the subscription.

Cases for binding the half-yearly volumes, 2s. each.

GOOD FRIDAY.

The next number of the BUILDING NEWS will be published on Thursday, April 10. All advertisements and other communications must reach the office by 5 p.m. on Wednesday, April 9.

RECEIVED.—B. C. B. I.—J. and W.—W. A. W.—P. and S.—C. P.—B. and Son.—E. M.—J. C.—L. W. R.—D. F. Co.—W. and H.—W. G.—G. B. and L.—R. L.—N. P. B. of E. S.—G. H. C.—C. and G.—D. and Co.—S. and Co.—J. J. C. and Co.—G. S. Bros.—S. L.—T. P. L.—J. McD.—H. J. and Son.—F. B.

A. J. FAYES. (The engineer to whom he is article will do it if he enters his office at an early age, meanwhile he should join the classes of construction and design at a science school.)

OLD HOUSES AT EXETER.—(Geo. S. Penny, 14, Rodney-terrace, Cheltenham, has sent us some interesting photographs of the old houses on the bridge at Exeter, described by Mr. Hems in the BUILDING NEWS last week. We cannot undertake to reproduce the photographs, but we believe copies can be had of Mr. Penny.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—Nemo.—Pagmoor.—Noah.—Saw Back.—Lennox Canning.

Correspondence.

CONCRETE PIPES AND BOURNEMOUTH DRAINAGE.

To the Editor of the BUILDING NEWS.

SIR,—The letter of your correspondent, "A. C. P.," on the above subject, in your issue of the 22nd inst., contains grave mis-statements, and a disingenuous manipulation of figures calculated to mislead.

We should take no notice of a strictly anonymous communication of this description, but inasmuch as your correspondent's initials are also those of the Mr. Ponton whom you refer to in your leading article, and who was employed by the Bournemouth Commissioners, we feel bound to point out the coincidence, as your correspondent ignores it, and the pamphlet also.

We thank you for your impartial review of our brochure, and trust that those of your readers interested will acquaint themselves with the facts on both sides, by procuring the publi-

cation, which includes Mr. Ponton's own report. It can be had of Messrs. Spon, or of your obedient servants,

HENRY SHARP, JONES, AND CO.
Bourne Valley Pottery, Poole, March 31st, 1879.

CONCRETE PIPES AT BOURNEMOUTH.

SIR,—The letter of your correspondent, "A. C. P.," read by the light of your leading article on the same subject, is decidedly instructive.

It needs no very great exercise of perceptive power to discover in the initials "A. C. P.," the Mr. A. C. Ponton mentioned in your article, and while he says that "some other tests were made, not on behalf of the manufacturers, and these tests did not give so favourable results," he omits to add that these other tests were made on behalf of the Bournemouth Commissioners by himself and Mr. Donaldson.

I cannot understand how "A. C. P." arrives at the conclusions he gives. I have read the pamphlet published by Spon, and with some difficulty I find the thirty-five tests that he first gives, but he has mixed them up in such a manner as to deprive them of value for or against.

He also states that the briquettes had a 2 $\frac{1}{2}$ sq. in. breaking section, but I see the book gives them as one square inch section—a vital difference.

Your correspondent does not refer in any way to the famous theory which Mr. Ponton propounded for the first time in the interests of the Bournemouth Commissioners, viz., that the pure water of this neighbourhood destroys Portland cement concrete. But, perhaps, after all, I am mistaken, for I cannot think that a "F.R.I.B.A." would act so unprofessionally as to attempt to prejudice a case in which he had been engaged by an anonymous letter, and in the manner above described.—I am, &c.,

A MEMBER OF THE ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

Intercommunication.

QUESTIONS.

[5720].—**Sketching Tour.**—Will someone kindly tell me in what pleasant country district in England I can best spend two or three weeks on a pedestrian architectural sketching tour with the principal towns that I should visit? Also the name and price of the best guide-book for my purpose.—S. R. A.

[5721].—**Damp in Basement.**—Will any of the readers of the BUILDING NEWS kindly suggest a remedy in the following case:—In the basement of a suburban house, the floors of which are of cement or compo-work, the water by some means forces itself through the floor in certain places periodically (especially after heavy rain), and although the occupier has had the places repaired with Portland cement, the water still percolates through as before. It is ascertained not to be caused by the drains, which are in good order, but is evidently the surface water. The cause and remedy will oblige.—R. M.

[5722].—**Dilapidations.**—1. Under what circumstances can repointing to external brickwork be required under the usual general covenants of a lease? Is it anything to do with the age of the premises? 2. When an old party wall is condemned by the district surveyor, and the adjoining premises are held on a lease containing the usual repairing covenants, but only a few years remain unexpired, what are the legal responsibilities of the lessee in the matter? An answer to the above questions will oblige.—TWEEDIE.

[5723].—**Floors.**—Would some practical reader kindly inform me as to the best methods for deadening the sound arising from ground floors in school-rooms? Also as to the merits of wooden blocks laid in cement, with a description of materials and the approximate cost of each method.—NOVICE.

[5724].—**Queen Anne Buildings.**—I am intending to visit London this Easter, and would be obliged if any of your readers would give a list of the best specimens of modern Queen Anne buildings. This information may be useful to others.—HENRY BARNES.

REPLIES.

[5709].—**Perspective.**—ERRATA.—In last week's reply, 14th line, for "span" read "show." 30th line, for "assured" read "assumed." 71st line, for "turn" read "from."—H. A.

[5711].—**Cricket Pavilion.**—I should have written an answer to the question asked by "Country Wickets" but that all I could say appeared so much like a shop advertisement that I abandoned the idea. However, if "Country Wickets" will put himself in communication with me I shall be glad to show him the drawings mentioned, and, if necessary, he can have a copy of the cricket pavilion. You were kind enough to give us (Mr. Robertson, my lato partner, and myself) a very favourable report on our Roundhay-park plans which we appreciated very much. We were not successful in taking any of the premiums, and most of our plans were spoiled before they

were returned, and all were sent back in a disgraceful state. We ought to get quite used to had treatment in competition matters.—J. J. STEWART, Architect, Wool Exchange, Coleman-street, Bank, London, E.C., 2nd April, 1879.

STATUES, MEMORIALS, &c.

THE GROSSER KURFÜRST MEMORIAL.—The design for the memorial which is to be erected in Folkestone cemetery in memory of the sailors who were drowned on the occasion of the foundering of the Grosser Kurfürst in May last, has been submitted to the Folkestone Burial Board and received its approval. The principal material used will be yellow sandstone, and for the ornamental enrichment and purposes of inscription bronze will be utilised. The top part of the design is of a pyramidal shape resting on a superstructure having for its base a slab of granite. The various emblems consists of cypress leaves, palm branches, wreaths of oak leaves, garlands, the arms of the Imperial German Navy, and the German ensign. The height will be about 19ft.

WATER SUPPLY AND SANITARY MATTERS.

DISS.—A Local Government Board inquiry was held at Diss, Norfolk, on Tuesday week, before Major Tulloch, relative to an application from the Local Board for sanction to a loan of £1,500 for carrying out works of sewerage by the urban sanitary authority. The plans produced and explained have been prepared by Mr. Charlton Walleston, C.E., and provide for carrying the existing sewers into a meadow in the parish of Palgrave, near the river Waveney, where it will be utilised for irrigation of 2½ acres of land. Objections were raised that the scheme was not sufficiently comprehensive, and that the proposed site would be a nuisance, but the inspector, after visiting the meadow and the suggested alternative sites, expressed his opinion that the works did not injuriously affect Palgrave, but that more land should be included in the scheme.

WATER SUPPLY OF LONDON.—An adjourned meeting of delegates from the vestries of the metropolis was held last week, in the Vestry Hall of St. Martin's-in-the-Fields, to consider the best means of improving the water supply. Mr. Edward J. Watherston was in the chair. About 24 vestries were represented. The chairman said that the most serious matter for the consideration of the ratepayers of the metropolis and the consumers of water was, not alone the increased and rapidly increasing value of the properties of the several water companies, owing to the principle upon which they were legally entitled to make their charges—upon annual value, with extras for high service, water-closets, and fixed baths—but also the reduction of a largely unremunerative expenditure, and the prevention of its continued augmentation by outlays for unnecessary works. Another matter of considerable interest to Londoners was the prevention of loss of life and property by fire. The work before them was to stop the growing power of the monopolies. In order to show the enormous and rapid growth in the rateable value of metropolitan property, he read a table showing the increase that had taken place in 30 parishes, where the values had risen more than 100 per cent. in the 20 years ending 1876. Among the most striking cases were those of St. Mary Abbott, Kensington, where the increase was 421·3 per cent.; St. John, Hampstead, 323; St. Mary, Battersea, 319·5; St. Mary, Stratford-le-Bow, 338; St. Leonard, Bromley, 301·8; Lee, 327·4; Penge, 338·3; and the Charterhouse, 444·8 per cent. The average increase in the rateable value was 104·7, showing a total increase of £11,827,650 in 20 years. Thus it had come about that the properties of the several water companies, which in 1856 were worth six millions sterling, were now roughly estimated at 26 millions; and unless a stop were put to their growing powers, they would before long be worth 35 millions. The work of the present committee would be to propose a scheme which, while it should be fair and just to the present holders of water stock, should be satisfactory to the general body of consumers. In conclusion, he held that the existing arrangements for supplying the metropolitan district with water were defective; 2, that the defects were not merely of a temporary character, but were inherent to the system upon which the existing arrangements were based, so as to be permanently detrimental to the public interests; 3, that it was absolutely necessary to remedy those defects in order to secure a better supply of pure and wholesome water, to be distributed under the constant system, and with such pressure and with such hydrant arrangements as would render it available at a moment's notice for the purpose of extinguishing fires; 4, that this could only be accomplished under a system of unity of management; 5, that from the economies possible under such a system, such alterations as might be necessary in the house services should be made, not at private, but at public expense; and 6, that

in the absence of a municipal corporation, or of any representative body willing or competent to undertake the consolidation of the works, it was requisite that this should be accomplished by a special water commission, responsible to the Local Government Board. A resolution to the effect that the chairman's speech should be printed and circulated was carried after some discussion, in which such strong opposition was shown to the suggestion that the proposed commission should be under the control of the Local Government Board that the chairman consented to withdraw the obnoxious clause, and the resolution was then agreed to. A resolution expressing the concurrence of the delegates in the views of the chairman on the principal points set forth in his speech was passed, and the meeting adjourned.

LEGAL INTELLIGENCE.

ARCHITECTS' CHARGES.—In the Sheffield County Court, on Wednesday, March 26th, before T. Ellison, Esq., judge, an action was brought by Martin Carr, Change-alley, architect, against Dr. Geo. Harrison, St. James'-row, to recover £12 for work done. The plaintiff's case was that he drew up plans and specifications for two dwelling-houses at Ranmoor, Sheffield, by the defendant's instructions. When tenders were sent in for the buildings the cost was considerably more than the defendant anticipated, he abandoned his purpose and subsequently sold the land. The defendant, who is a retired chemist, first intended to build a detached dwelling to reside in, for which the plaintiff made him preliminary sketches and gave an approximate estimate; this plan was abandoned, and another plan made for two semi-detached houses, when another estimate was given, but the plans were rejected on account of cost. The plaintiff then prepared sketches of less expensive houses, but were not accepted by the defendant, as he considered something better should be built. A final set of plans were made and approved, and instructions given to prepare specifications and quantities and advertise for tenders. The lowest tender being £1,200, on which the claim was based, 2½ per cent. being charged for plans and specifications, and 1 per cent. for quantities. For the defence it was submitted that £5 which had been paid to the plaintiff was sufficient compensation, the cost of the buildings being several hundred pounds more than the defendant intended to pay. The building rules of the estate were produced to prove that the price of a pair of houses on that particular part should be of the value of £300. His honour, in summing up, said that as he (the judge) understood it all such rules fixed a minimum price only. The defendant, who was a retired gentleman, wished to include a greenhouse, in addition to a good library, &c., and could not expect to have these things provided for the amount stated in the defence. Judgment for the plaintiff for the sum claimed with costs.

BAD MORTAR.—At the Worship-street Police-court, before Mr. Busby, on March 27th, 1879, Mr. Henry Shipp was summoned by Mr. C. A. Gould, the District Surveyor for East Hackney (South) and North Bow, for erecting the enclosing walls of ten dwelling-houses in the Morier-road, Bow, with improper mortar. Mr. Gould conducted his own case; Mr. Shipp was represented by a solicitor. The solicitor for the defendant made an objection to the wording of the summons, that it was contrary to the Act, and that no offence was committed. Mr. Busby overruled the objection and amended the summons to the wording of the Act, "without the same being properly bonded and solidly put together with mortar." Mr. Gould produced specimens of the material used as mortar, and explained to the magistrate that it consisted for the most part of 'dirt,' with a very small proportion of sand and lime, and that although it might dry tolerably hard it would never set, and, as an illustration, produced a specimen in a bottle of water, which, after drying hard, he had been able that morning to shake up into so much mud, a portion of the vegetable matter floating on the surface. Mr. J. M. Knight, surveyor, was called by the defendant to rebut the evidence, and spoke of the very general use of burnt ballast in some parts in lieu of sand, but on cross-examination could only point out a few specks, and one or two thin lines of red in the specimen he produced from the disputed works; and on a specimen being handed to him by Mr. Gould, said "it was very good, and, he thought, better, perhaps, than the specimens he had produced." Mr. Gould then stated that the specimen he, Mr. Knight, had just approved of was a lump of mud from the canal adjoining. Mr. Busby made an order for the works to be pulled down.

THE DUSTMAN'S QUESTION.—Queen's Bench Division. (Before the Lord Chief Justice and Mr. Justice Mellor. Collins v. the Vestry of Paddington.) This, which may hereafter be known as the "dustman's case," raised a question as to what is included in dustmen's contracts to carry away ashes, dirt, refuse, and rubbish. The plaintiff had entered into a contract with the vestry to take all the breeze, dust, cinders, ashes, dirt, offal, garbage,

filth, and refuse which should be collected and removed by them, their contractors, agents, and servants within the parish for a year, which they sold to him for the sum of 6d. a cartload, and they contracted with him that they would at their expense deliver and deposit this breeze, &c., upon a brickfield of his at Shepherd's-bush. The vestry sent carts, under charge of their men, to collect the contents of the dustbins, and it was the duty of their men to take the contents of the dustbins out of the bins, put them into carts sent by the vestry, and then take them to the brickfield. The dust heap accumulated in the brickfield would, at some time or other, be sifted in order to separate the cinder, breeze, and ashes, which are used in brick making. In the course of this process the articles in question, which in the business are known as "tots," are separated, and those of the same kind being collected together are saleable, and upon a large contract like the present are of considerable value. The articles are of a very miscellaneous kind; but among the most valuable are broken white glass, bones, articles of iron, lead, and other metals, and knife handles. Throughout the period covered by the contract the dustmen employed by the vestry in collecting the contents of the bins were more or less in the habit of picking over the contents of the bins, of abstracting portions of the more valuable articles, of putting them into sacks of their own, and of selling the articles so abstracted for their own benefit. This process of selection was generally (though not exclusively) carried on upon the premises upon which they entered for the purpose of collecting the contents of the dustbins, and in these instances the men so acting either took the articles in question from the dustbin itself, from the baskets used for carrying the refuse from the bins to the carts, or as the refuse was in the act of being transferred from the bin to the baskets. They also took such articles from the carts themselves, when opportunity offered, and dealt with them in the same manner. The contractor at the close of the year, having paid the vestry £300, brought an action to recover from the vestry a sum of £1,500, the alleged value of these "tots" during the same period, his case being that they were withheld from him by the dustmen of the vestry, and that the vestry were responsible to him for the value. The vestry denied any such liability, and the action came on to be tried before Baron Pollock in November last year, when it was referred to the arbitration of Mr. Wills, Q.C., who stated a "case" to the effect above stated for the opinion of the Court, the question put being "whether the contractor is entitled to damages for the abstraction of the 'tots' by the dustmen in the circumstances stated." After some discussion, the learned judges consulted together for some time, and then proceeded to pronounce judgment in favour of the vestry.

THE ARTISANS' DWELLINGS COMPANY AND THEIR CONTRACTS.—FRANKENBERG v. THE ARTISANS', LABOURERS', AND GENERAL DWELLINGS COMPANY (LIMITED).—This case, tried last week in the Queen's Bench Division, before Mr. Justice Field and a special jury, was an action to recover a large sum of money for goods sold and delivered. The defendants admitted that the goods were supplied, but contended that they were not ordered by the proper officers, that the prices were unfair and unreasonable, that the contracts were entered into in fraud and collusion, and the defendants sought to recover back the money overpaid. Plaintiff who is a foreigner, had been established in business in this country for some years in the oil and glass business, but lately in ironmongery, and he had brought this action to recover a sum exceeding £3,000 for goods supplied to the defendants. The company in question was formed in 1867, principally by a person named Swindlehurst, in connection with Mr. Evelyn Ashley and other gentlemen of position, for the purpose of erecting dwellings for the artisan class. They commenced by purchasing Shaftesbury Park Estate at Wandsworth, and Swindlehurst, who was manager, secretary, and one of the directors of the company, made contracts with a variety of persons, and amongst others with the plaintiff for glass, oils, and paint, and subsequently for ironmongery and plumbing. The defence was, he understood to be, that the prices charged were so excessive that either there must have been fraud committed by the plaintiff's bribing Swindlehurst or having allowed him to share the profits. So far from either charge being true, nothing had passed between the plaintiff and Swindlehurst in the shape of bribery but the present of a goose (laughter) at Christmas and a dinner service on the occasion of a marriage in Swindlehurst's family. The oils, paint, and glass were supplied at the market prices, so was the ironmongery, with the exception of a few articles that might be picked out as being high. Mr. Justice Field said he had so far listened attentively to the statement of the learned counsel, and also he had looked over the voluminous particulars and details on both sides. It appeared to him hopeless to try the case by a jury. If the case consisted in an ascertained and definite charge it could be done, but instead of that it was only whether this large number of items was charged at a reasonable

price. After some discussion the judge said he must exercise his power, and refer the case, under the 57th order of the rules and orders made under the Judicature Act. He therefore made an order that the case should be referred to the official referee, with power to apply to him (Mr. Justice Field) at Chambers.

Our Office Table.

THE architectural profession has lost one of its best known and most esteemed members in America in the death of Mr. R. G. Hatfield, of New York city. For many years Mr. Hatfield had been a prominent officer of the American Institute of Architecture, of which he was one of the founders, and also a member of the American Society of Civil Engineers. His contributions to scientific periodicals were many and valuable, his last, a very ingenious discussion of the origin and nature of the ancient structure known as the Old Mill at Newport, R. I., appearing in *Scribner's Monthly* on the day of his death. Mr. Hatfield was much consulted by his professional brethren in difficult undertakings. The arched iron roof of the Grand Central Railway Depot in New York city is regarded as a fine illustration of Mr. Hatfield's boldness and skill as a designer. His last public service was as Chairman of the Committee of Award in a competition of designs for model houses for working men.

THEY manage some things more quickly in France—whether better than here is another question. The Bordeaux Regatta Club took advantage of the passage of the Duke and Duchess of Connaught through their town to testify their respect for their Royal Highnesses and commissioned one of their members, M. Tristan Lacroix, an artist of some distinction, to paint a picture of the Osborne as she lay in the Roads. This picture, first thought of the preceding day, was painted in oil, completed and framed by the time their Royal Highnesses arrived and presented to them by the president.

THE people of Connecticut have an elephant on their hands in the shape of the new capitol at Hartford. The weight of the tower has proved greater than the piers designed to sustain it can withstand, and the consequence is, the veneering of granite surrounding the southern piers is splitting off in flakes near their bases, and the whole tower is in danger of being let down into the basement. It is reported that over 15 tons of type-metal have been used in trying to remedy the evil effects of hasty workmanship and engineering. The metal has been run, while in a molten state, into the joints of the granite, with the forlorn hope that it would equalise the bearing; for it appears that the shell of granite was laid dry, without cement or any other filling in the joints, and the crushing of the stone is attributed to unequal bearing.

To make shoe-pegs enough for American use consumes annually 100,000 cords of timber, and to make our lucifer matches, 300,000 cubic feet of the best pine are required every year. Lasts and boot-trees take 500,000 cords of birch, beech and maple, and the handles of tools 500,000 more. The baking of bricks consumes 2,000,000 cords of wood, or what would cover with forest about 50,000 acres of land. Telegraph poles already up represent 800,000 trees, and their annual repair consumes about 300,000 more. The ties of the railroads consume annually thirty years' growth of 75,000 acres, and to fence all the railroads would cost 45,000,000dols., with a yearly expenditure of 15,000,000dols. for repairs. These are some of the ways in which American forests are going. There are others; packing boxes, for instance, cost in 1874 12,000,000dols., while the timber used each year in making wagons and agricultural implements is valued at more than 100,000,000dols.

THE third of a course of eight lectures on the art of the Italian Renaissance was delivered on Saturday by Dr. Todhunter, in the Museum Buildings, Trinity College, Dublin. The subject was "The True Renaissance: Invasion of the Secular Element," the phase of art described being the rise of the class of painters who distinctly aimed at technical perfection, apart from, and even sometimes in direct antagonism to, higher qualities—spiritual and intellectual. Of

these artists, who strove after skill in linear perspective in drawing the human figure, in painting from the nude, and in relief produced by chiaro-scuro—perhaps the first was Pietro du Puccio, whose sculptural fresco-scenes were fully described. Paolo Macello, born in 1397, might be regarded as the second great student of scientific perspective, and he was followed by a school of men in whom the art of the Middle Renaissance culminated, men who were, however, rather complete painters than originators. In Sandro Boticelli, subjects from heathen mythology were for the first time introduced, and these were treated quite in a modern spirit. He afterwards abandoned painting and became a penitent. If Leonardo were the Faust of Italian art, Sandro was the Hamlet; all his conceptions were melancholy, strongly individual, and essentially modern in style. Two other painters of their period, Filippino Lippi and Domenico, without possessing the genius of Boticelli, excelled him as mere painters.

AN American competition with some novel features about it has not proved favourable to the development of architectural morality. The city council of St. Paul, Minn., having occasion to build a new market-house, and apparently distrusting its ability to reach a satisfactory result by the usual process of inviting a competition of designs, has hit upon the device of inviting a competition of bids for furnishing plans, specifications, and superintendence for the building. They accordingly addressed their propositions to two architects, Mr. E. P. Bassford and Mr. A. M. Radcliff, and in reply the former agreed to do the work for three per cent. on the cost, and the latter for two and one half per cent. Mr. Radcliff was accordingly appointed architect of the new market-house. The high tone of professional practice which renders such a competition as this possible may be inferred from the fact that Mr. Bassford in a card has charged his competitor with a breach of trust, having agreed with him on a price of three per cent., while Mr. Radcliff rejoins that their agreement was on four per cent. and not three per cent., "but," he adds, "knowing from past experience Mr. Bassford's custom in competing for plans with myself, I put my bid for two and one half per cent. The result shows by his bid how well he kept his word." "It is not within the province of the American Institute of Architects to establish missions," remarks the *American Architect and Building News*, "but we might hope that the trustees would find it practicable to circulate some wholesome tracts in this neighbourhood with a few to the placing of professional practice there upon a sounder footing."

AMONG the numerous and beautiful Irish works in decorated metal in the Museum of the Royal Irish Academy, the Cross of Cong holds, says the *Limerick Reporter*, a foremost place, not only for its size, but also because it is a production in which are displayed the highest qualities of decorative art. In the year 1123, according to the Irish annals, "a portion of the true cross" was presented to Turlough O'Connor, the King of Ireland, who died in 1156. On receipt of this much-prized gift, the Irish monarch had it enshrined in the metal work yet existing. From the inscriptions on this case, two in Latin and four in Irish, we learn that King Turlough O'Connor had it made, that the work was executed under the superintendence of the Bishop of Connaught, Flanagan O'Duffy, and that the maker of it was Maclisa MacBradden O'Echain. In height this relic is 36in., the width at the cross arms is 18in., and its thickness is a little more than an inch. It is composed of gold, silver, enamel, niello, and bosses of variously coloured glass. There are a great many patterns of intricate design, and the result is a composition that for beauty of invention, management of colour, and masterly execution equals, if it does not excel, any work in ornamented metal that has ever been made. At the bottom of the cross is a circular socket, but no part of the staff remains. The designer of the cross has departed from the rigid picturesque straight lines and the rectangles of his exemplar, and has produced a work in which beauty of form, variety of colour, and exquisiteness of ornamentation are united in the true poetry of art. The outline is bold and elegant, and the junctions of curves are decorated with bosses, and the entire is of the highest quality, both for artistic conception and excellent execution.

SEVERAL Cabinet Ministers and a large number

of other visitors attended the dinner of the Institution of Civil Engineers on Wednesday. The Secretary for War responded to the toast of the Army, and the First Lord of the Admiralty for the Navy. The Colonial Secretary, in his speech in reply to "Her Majesty's Ministers," while bearing testimony to the important part which the labours of Civil Engineers had played in connection with the development of our Colonies, said he sometimes fancied that in considering schemes which were promoted for the welfare of our younger colonies, sufficient regard was not paid to the small means possessed by those communities. Lord Derby responded for "The House of Lords," and Mr. Roebuck for "The Commons." Mr. Lowe proposed, "Art, Science and Literature," to which Mr. Barry, Professor Owen, and Mr. Anthony Trollope responded. The Earl of Kimberley gave "The Guests," and the Lord Chief-Justice proposed "The Health of the President."

IN order to make the character and claims of the Builders' Clerks' Benevolent Institution more widely known, a dinner was held at the Guildhall Tavern, Gresham-street, E.C., on Wednesday evening, under the chairmanship of the president, Mr. Thomas F. Rider, who had made the suggestion. The experiment proved a success; about a hundred were present, and it was agreed to make the dinner an annual festival. The president, in proposing the toast of the evening, "Success and Prosperity to the Builders' Clerks' Benevolent Institution," sketched, in humorous terms, the history of the institution, from its founding by a few gentlemen in February, 1866, to the present time, and expressed his regret that it was not more widely supported by the class sought to be benefitted. Although in the London Directory there appeared the names of 1,400 builders and those in cognate trades who, allowing half a clerk a piece, surely employed some 700 clerks, yet there were only about fifty subscribers among the latter. He invited any builder's clerk who saw any cause for complaint, anything unsuitable, or which appeared capable of improvement, either in the institution or its management, to meet the committee, who would promise either to convince him that he was wrong, or to admit their own error and try to correct it. While the institution ought to be self-supported, still it was worthy of encouragement and aid by the master builders, and by the benevolent in this vast city, the charitable metropolis of the world. The toast was received with enthusiasm. The toast of "The Architects and Surveyors" was proposed by Mr. Howard Colls, and replied to by Mr. Franklin. Mr. T. Plucknett, in responding to the toast of "Our Employers, the Builders," urged the clerks to make the institution self-supporting and still more useful, and suggested that instead of electing one of the great master builders as president they should depart from precedent, and place one of their own number in the chair. Mr. H. J. Wheatley, secretary, announced, amidst applause, a list of donations, headed by twenty guineas from the president, and amounting to £144 17s., besides several fresh subscriptions. Amongst the principal toasts and speakers were, "The Army, Navy, and Volunteers," responded to by Major Brutton, secretary to the Builders' Benevolent Institution, and by Captain Williams; "The President," proposed by Mr. Dove; "The Past Presidents," proposed and replied to by Mr. Brookes and Mr. Plucknett respectively; and "The Treasurer (Mr. H. T. Bayes) and the Committee," proposed by Mr. Hamilton, and responded to by Mr. Bayes.

IT will be noticed that the BUILDING NEWS is increased in size to-day by the addition of eight pages. This enlargement, which is permanent, has been rendered necessary by the increase in our advertisements and the consequent pressure on our space. The eight pages added have been divided equally between our readers and our advertisers, so that both will be gainers. Advertisers will notice that a redistribution of the advertisement pages has been effected, which, without interfering with the appearance of the journal or with the convenience of binding, will in future afford additional facilities for those who desire prominent positions for their announcements.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of fevers, biliousness, small-pox, skin diseases, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker, 113, Holborn Hill. Use no substitute.—(ADVT.)

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 11, 1879.

THE CHELSEA EMBANKMENT.

FOR an uninterrupted view and southern aspect, few residential localities near London can compare with the Chelsea Embankment. With an extensive river frontage towards the least objectionable part of the Thames, and Battersea Park on the other bank, the occupants of the new residences built in this fashionable part will enjoy advantages to which residents in the neighbourhood further northwards are strangers. Since Mr. Norman Shaw erected that unique reproduction of a quaint old English manor, called Old Swan House, a row of stately houses, conceived in a similar spirit, has been built along the promenade, which will before long become one of the most striking in the West End. It cannot be said that monotony, either in architectural design or of colour of material, is a vice here, for the architects, who have been striving to outvie each other in producing buildings in the prevailing style, have rather launched out in the other extreme of informality and extravagance. Next to Old Swan House is a mansion designed by Mr. A. Croft, in red brick, offering a diverting contrast to Mr. Shaw's unaffected Low Dutch. It has been built by Messrs. Gillow, has a somewhat cramped look, is broken by a deep recess between projecting bay windows of different shapes and styles, which, together with the plaster ornament, dissipates the effect. The red brickwork and carved friezes over the bays are of excellent workmanship, but the cut brick gables and ornament destroy all breadth, which is the great fault of the composition. We shall shortly illustrate it. Adjoining is a red brick, double-bayed house, built for Mr. Armitage, R.A., we believe, from Mr. Shaw's design. Next to this we come to several red brick mansions, one designed by Messrs. Goldie and Child; another built by Messrs. Macey and Sons, has a large, flat bay and gabled end, but possessing few points for remark. A little further up the embankment is a clever corner treatment in a simple style, the materials being stock, with red dressings; the arched squinch at the side of house is an ingenious and not displeasing mode of obtaining a front view; after which we come to houses building by Mr. Lascelles, Messrs. McLachlan and Sons, and Messrs. Kirk and Randall. Some of them are cut up by the mixture of white and red brick introduced, with a rather spotty result. Mr. Phené Spiers is the architect of one in red brick.

Messrs. Gillow and Co.'s new houses, from the design of Mr. E. W. Godwin, illustrated and described by us, p. 264, Vol. XXXIV., and visited by the Architectural Association last Saturday, exhibit externally a quiet and more moderate style. Quaintness and Queen Anne features are not prominent, though there is a breaking up of elevation conducive to freshness rather than fidgettiness of manner. We cannot altogether bring ourselves to think there is anything gained by the recessed bay windows, nor any peculiar charm in the arching over of the angular nooks except the light and shadow obtained thereby. In confined streets the idea is a good one, but a recessed bay under ordinary circumstances is something like an advantage nullified. Externally stock and red brick have been blended, and as the recessed bays are entirely of the latter material—that spottiness of effect we have complained of elsewhere has been avoided. The breaking back of the dormer gables to get a side-light has an un-

pleasant if not fidgetty appearance, and the white plastered finish is not in keeping with the lower parts. Lower down the cut eorrels to the balconies have a rather feeble look. Three houses have been built, but the corner one may be taken as an example of the others, though larger and more expensively finished. The entrance is on the return side in Tite-street, and here a recessed porch is the chief feature. The doorway forms a pedimental porch in carved red brick projecting from a recessed wall, the recess above being arched and the line of wall carried flush. The hall is wide and spacious, the staircase being returned at the bottom with a balustrade of quiet and massive design opposite the door. On the left is the library, with cant bay end, and adjoining a narrow room called a business-room, lighted by a window on the slant, which, together with the canted side of bay, forms a nooked balcony. The dining-room, entered from the right of hall, is certainly too small, and has been sacrificed to a billiard-room facing and lighted from Tite-street, the two rooms communicating directly by a door. The fireplace strikes us as we enter the dining-room. The chimney-piece is designed in a massive Anglo-Classic style; the architrave jambs flanked by cut consoles, a bold cornice broken into three faces forming the mantel-shelf. The mouldings are effective and characterised by the ovolo and bolder forms of the English Renaissance; the stove, of the slow combustion kind, is set in a framework of painted tiles, with figure-subjects at the sides, and Japanese frets in the corners, and a panel representing the orb of day with birds above the firegrate. The latter has a brass front of clever Japanese design, and a black and chocolate tile hearth. There is nothing else of remark, as the woodwork, left in plain stone drab, remains to be painted. The grey tile front of fireplace in business-room, and the plain reeded brass front of grate with blower impressed with a neat Oriental zigzag, are unique. A stairs and w.c. is provided near the billiard-room, and a back passage forms a communication between it and the library. The basement is certainly gloomy, and the arrangement certainly not a model in its way. On the first floor the drawing-room is decidedly small and insufficient, and many a second-rate villa in the suburbs could boast a larger one. As on the ground-floor, the drawing-rooms are sacrificed by the large central landing and stairs. A boudoir is obtained at the side of the front drawing-room, though it would have been much better to have thrown both rooms into one. In the drawing-rooms the chimney-pieces are of a more elaborate design, and the painted tile fronts have figure subjects, the colours being blue and yellow. The windows have fixed fanlights in small squares, and casements to open below, and these lead out on to balconies. We notice the back corridor is screened from the staircase by a glazed partition in panels, but we wonder what the row of gabled niche-like projections along it are intended for. Are they for bells? A lift is provided at one corner of the dining and drawing-rooms, and its space has been turned to account in making recesses in both rooms. We must say we dislike the framing of the doors with centre oblong panels, a favourite conceit with the Queen Anne revivalists. The steps to the front entrance are exceedingly awkward; the treads are narrow enough and the risers steep enough to compare with the flights of many two-storied tenements. Entering one of the other houses which are less in depth, the area of plot measuring about 112ft. by 30ft., we find it contains a spacious hall with tessellated pavement, a front library 17ft. 4in. by 17ft., and a dining-room behind, including recess, 23ft. by 17ft. The vestibule is 10ft. square, and is separated from the inner hall by an arch abutting against a square

pilaster which rises from the newel of staircase, a short flight commencing opposite the library door. A lift and serving lobby are provided with back stairs in the rear at the end of dining-room. Upstairs the drawing-rooms, front and back, communicate by folding doors, making an apartment the whole depth of house, 42ft. by 17ft. There is a small front boudoir. On the second floor there are two bedrooms, a dressing-room, and bath-room fitted with hot and cold water, a lift, and w.c. There are three bedrooms on the next floor, and three servants' rooms in the roof. In the internal fittings we notice similar stoves and chimney-pieces, though no decorative finishings. The lease of these houses is for a term of eighty-five years at a ground rent of £90, convertible into freehold, and the price £9,000, the corner house being £12,000.

In Tite-street several new houses and studios have been built, or are in progress, that deserve mention. One of these nearly finished, for Mr. A. Stuart Wortley, from the designs of Mr. E. W. Godwin, we have inspected. It forms the corner house, one front of which faces the side of the corner mansion of Messrs. Gillow described above. There is something to be said for the piquancy and quaintness of this artist's residence. We miss that fussiness and fidgetty love of cut gables and carved brickwork and strips of pilasters which some architects love so much; the fronts are plain and quiet, of stock brick relieved by red facings, a bright red tile roof of Mansard form crowning the building. There is nothing in it in common with Mr. Whistler's house, standing on the opposite side of the road, which has given rise to so much adverse and amusing criticism. It is a plain Old English type of house, with mullioned casements, and 17th century detail. There are two entrance staircases, as the house is to be inhabited by two bachelor artists, but the internal arrangements make really but one house. The staircases form external semi-octagonal tower-like projections, and the canted bay windows carried up at the corner make a picturesque grouping, though a little curious. One peculiarity is a balcony thrown across the angle of bay above entrance. The lower rooms are small and unpretentious, rather low, the windows mullioned with casements of small squares, and the cornices and mouldings simple and effective. The stairs have pleasing turned balusters, solid-looking newels, and well-moulded handrails. The chimney-pieces are of the Queen Anne type, with effective "thumb mouldings," and have slow combustion stoves, with a cast Japanese pattern blower. Upstairs there is a drawing-room and private bedroom *en suite*, 41ft. long, with folding doors of several leaves between the two, which will fold into large boxed jambs. This is certainly a rather clumsy way, as the boxed architraves project considerably into the rooms, and sliding doors could have been easily formed. But sliding doors are inartistie things! The arched recessed fireplace is a pleasing feature in this room, and the details of oak chimney-piece and brass dog-grate exceedingly simple and nice. A genuine piece of carving is introduced into a panel over the head of the folding doorway. We also notice the bath is simply recessed in one of the bedrooms. As in Mr. Whistler's and Mr. Frank Miles's house, the studios (there being two) are in the roof, which is constructed with two slopes, the lower or steeper portion being pierced for openings, and ceiled at the junction in the manner described by the architect in a recent paper read by him at the Association (see our report, March 8th). These studios make lofty, well-lighted rooms, about 40 by 20ft.; the walls and ceilings (which follow the rafters) are simply whitened, and in one of the studios we notice a large, German porcelain stove, which is found very economical

as a heating agent. There is a bay window at end, and two lofty window casements at side, running into roof in one of the studios. The other is lighted from ends. At one side is an overhanging passage, with a long, narrow trap-door in the floor of it for raising large pictures and canvases. Everything is of the plainest description, and we believe the woodwork will be painted white, or very slightly relieved. The "White House" (Mr. Whistler's), on the opposite side of the road, is of an extraordinary character—certainly less pleasing. Architecturally, we cannot place it in any of the usual categories; there is decided evidence in the mouldings to the pediment of doorway of refined taste, and a semi-Greek feeling breathes in the delicately-cut members and incised window-heads which enrich the plain white brick and stone surface of an extremely severe and monumental type of building; though for anything beyond this, either artistically or architecturally, we cannot speak in praise. Another house and studio is building at the other end of Tite-street, but its unfinished state does not admit of our saying anything of it. Stock and red brick, and tile roof in two slopes, are characteristic, though we must not forget to mention a deep-red brick parapet of extremely archaic character; a feature we notice, also, both in Mr. Stuart Wortley's and Mr. Whistler's houses.

ARCHITECTURAL DIAGRAMS.

IT is an easy matter for the student or the learner to turn to a score of excellent manuals, in which he may find an endless store of useful and practical hints upon drawing materials, and the management and execution of designs and drawings of every kind. With so much information thus readily obtainable upon the technical details of his art, the scarcity and difficulty in obtaining correct and reliable data, to guide him in the preparation of diagrams for the class-room, the committee, or the lecture hall, is all the more marked, and it is probably owing to the absence of all information upon this subject that so many diagrams upon which a vast amount of time and trouble has been expended prove very unsatisfactory for the purpose for which they were made, and that the illustrations which appeared admirable in the drawing office are so often next to useless in the lecture theatre. It may be urged that the making of diagrams seldom falls to the share of the architect; that it is no part of his professional work, and that by a few well-directed inquiries he can soon learn all that is necessary upon the subject. To the first of these objections, we can only say that cases constantly happen where drawings which can be shown simultaneously to a large number of people, are required: in law-courts, for instance, we too frequently find in disputed questions of light and air, boundaries, encroachments, and a score of other subjects, which will occur to our readers, that small-scale drawings are produced by counsel and witnesses and handed round, which very inadequately convey what is meant to the unprofessional observer. Whereas a good clear diagram hung upon the wall of the court with reference letters, could be explained intelligibly to all at once, and would clear up a host of difficulties and misunderstandings. The architectural lecturer ought, one would think, to know what is required in the way of diagrams, and would provide himself with suitable illustrations; but, strange to say, while the diagrams of the civil engineers are, as a rule, all that could be wished in works of this kind, those of the architect are generally small, confused, and unsuited for the purpose. It is only when he is led to inquire into what is best that he will find how difficult it is, as we have already pointed out, to find any rules upon the subject; and in the hope of

assisting him therein, we have brought together a few practical hints for his guidance. Firstly, concerning the material to be used, the principal rule is, if possible, to avoid paper of every kind. Cases may, perhaps, arise where paper can scarcely be dispensed with; and for such works the best material is the continuous cartridge lined with calico. By far the best substance, however, to draw on is what is known as "blind union," a strong, glazed calico specially manufactured for roller-blinds. This fabric can be had in unlimited length and of almost any width up to 3 yards, and has a pleasant and smooth surface to draw on. It also takes the colour well, and owing to its freedom from creases and folds, it possesses many advantages over other kinds of calico. It is usually sold on rollers, and care should be taken to keep it rolled, for when once folded it is impossible to remove the marks. For smaller diagrams, a cheaper variety of calico, known as "glazed lining," may be employed. This can be had in a great number of tints, and the black glazed lining is often used for engineering diagrams, the outlines in this case being, of course, in white. In using the calico, it should be tacked down on a flat table, but not stretched, and, except in the case of large washes of colour, no trouble will be experienced from shrinkage. When it becomes necessary to cover large surfaces with colour, it is generally better for diagram work to resort to rough cross-hatching. At a distance of 25 to 30 feet no difference is perceptible between a surface hatched over and one tinted. It is as well to remember that unglazed calicoes, as, for instance, "sheeting" and "twills," are more difficult to draw on, do not take the colour nearly so well as those which are glazed, and are liable to let the colour through them. In drawing the outlines of the work a soft pencil should be used and any marks made in error should be left as they are, and not erased with bread or indiarubber. Any erasure spoils the surface for tinting, and pencil lines are quite invisible at the distance from the eye at which diagrams are commonly employed. When the design has been outlined the colours of brick, stone, timber, &c., should be filled in, using gum-water as the medium for mixing the washes. A small ground glass slab, with a glass rubber, such as is sold by colourmen for tempera painting, will be found the most useful appliance for preparing the colours. First drop on the necessary quantity of stiff gum-water, of the consistency sold as "liquid gum," then add the colour and rub it into a creamy paste, just thin enough to flow from the brush. As lecture diagrams are more frequently than otherwise for use by artificial light, strong bright colours should be used. Vermilion is an excellent red for brickwork, &c., but it is very costly, and a substitute known as Chinese red is much cheaper, and covers well. Medium chrome is a good bright yellow, and cobalt the best blue. For the outlines use lampblack, or the variety known as ivory black, which gives a far finer and deeper tint than Indian ink, so often employed for diagrams. Do not use a ruling pen for the lines, as a much thicker line than can be ruled is in most cases required, and a line painted with a small brush is quite even enough for the purpose. Diagram lines are seldom wanted less than one-tenth of an inch in thickness, and the shadow lines may be one-fifth of an inch thick. Any lines made in error may be covered up with flake white; where tints have to be applied, they should be put on before the black lines, as the black can easily be laid over any other colour. It is somewhat difficult to indicate the best scale to be employed, as no one rule is applicable in all cases. Diagrams of buildings for use in large rooms should not be drawn to a less scale than one inch to the

foot; we generally work to one-eighth full size for buildings of a moderate size. Block printing is best for diagram-work; the letters for titles and the principal places should not be less than 3in. high, and the small letters not less than 1½in. As a general rule, it is well to trust as much as possible to plain shaded outlines. Shadows and flat-tints are apt to confuse. The calico diagrams should be tacked to a strong lath at the top only, and allowed to hang freely against the wall. With a little care they are easily nailed up so as to hang quite flat. If they are to be used repeatedly they may be rolled round the laths used to suspend them from, and are thus kept free from creases. It is seldom necessary to use diagrams larger than one yard by 2 yards, and it is better to subdivide the work so as to employ a number of diagrams of this size rather than the cumbersome and unwieldy sheets which exceed these dimensions. We may state, in conclusion, that excellent blind-union may be purchased at the rate of about 7d. per square yard, and that the colours suitable for the purpose cost about 1d. or 2d. per oz., and are best applied with camel's-hair or sable brushes.

THE SINKING OF TUBULAR FOUNDATIONS BY COMPRESSED AIR.

ALTHOUGH the method of sinking iron cylinders for bridge foundations by the "plenum pneumatic," or compressed air process, is well understood by engineers, there are very few, we imagine, who are acquainted with the practical methods adopted. To the United States we must turn for any information of this kind, and it is satisfactory to be enabled to give some more precise details than ordinary descriptions and reports furnish. We find in the current number of the *Transactions of the American Society of Civil Engineers* a very instructive paper on the subject, by Mr. D. McN. Stauffer, C.E., member, describing the application of compressed air to South-street bridge. The plan adopted was proposed by Mr. John W. Murphy, C.E., who was also the contractor for the bridge. The latter crosses the Schuylkill river at a part 467 feet wide from the banks at low tide, with an average depth of water at low tide of 20 feet, and a range of tide of 7 and 6-10ths feet. A marshy meadow [subject to overflow bounds the river on the west. The rock or substratum of river consists of a micaceous gneiss, dipping and irregular in surface, soft and shelly on top, above which was found a deposit of hard gravel, sand, and mud, varying in depth from 24ft. to 5ft. There were three spans of iron, two 192ft., and between these a draw span of 200ft. long. Between the truss centres the widths, exclusive of footways, were 36ft. in the former and 23ft. in the latter case. The arrangement required, therefore, three piers: one a pivot-pier, its centre being 99ft. distant from the centres of the piers east and west of it. The footways were outside of the trusses. From the flow to low tide level was 42ft. Such were the conditions of the site. It now remains for us to describe the manner in which the pier-cylinders were constructed, and how they were sunk in water 50ft. deep till they reached a rocky bed. They were made up of east-iron cylinders made in sections 10ft. long, with a thickness of metal of 1½in., joined by inside flanges 2½in. wide and 1½in. thick, with bolts 1½in. diameter spaced 5in. apart from centres. The pivot-pier was composed of a central column 6ft. in diameter surrounded by eight columns, each 4ft. in diameter, arranged octagonally, the cluster having an outside diameter of 36ft. The mode of sinking was both ingenious and simple. No platform was used, but two common canal boats, each 100ft. by 17ft. wide, and drawing 4½ft. of water, were placed parallel to each other 15ft. apart, and

secured by two timber clamps, each made of three pieces 12in. by 12in., resting on the boats, and extending to their outer sides. The opening made between the clamps was adjusted to suit the diameter of the cylinder, and the clamps were drawn together and made to "hug" the cylinder between them by two heavy iron rods passing through them on each side of it, with nuts and cast-iron washers. Upon this platform of boats and clamps a four-footed derrick 50ft. high, made of 12" x 12" timber, and well braced, rested, its apex being directly over the centre of opening. Its feet were secured by strong iron straps and bolts to timbers framed into the two boats. The hoisting tackle was made of two double 12in. blocks, with a $4\frac{1}{2}$ in. rope, worked by a capstan on one of the boats. Some care was required to keep this floating platform in position—to prevent its being shifted by the tidal currents, and for this purpose four heavy anchors from the bows and sterns of the boats had to be maintained, and the cables adjusted when necessary. The compressed air machine necessary for supplying air to the workmen in the sunken cylinder consisted of two single-acting air cylinders, 9in. in diameter and 10in. stroke, with a small reservoir at the top of machine. It was a single 8-horse power "Burleigh compressor," and was placed in the hold of one of the boats. A storage reservoir in connection with it—an ordinary cylindrical steam boiler set on end, 22ft. long and 2ft. diameter—was provided, to keep always in hand, in case of accident or stoppage of engine, one half-hour's supply of compressed air, so that the workmen inside would have time to escape. The air was conveyed by a gum and canvas hose, $4\frac{1}{2}$ in. diameter, to the working column under operation. Having thus given some explanation of the apparatus, we may next describe how the cylinders were united and sunk. The position of the pier or column having been marked by points on the shore, the boats and derrick were brought over the site, and the sections to form the cylinder were one by one rolled on the clamp timbers attached to the hoisting tackle, bolted together, and then lowered between the clamps. The operation was as follows: the bottom section had no lower flange, the better to enable it to penetrate the bed of river; it was hauled up into a vertical position, lowered between the clamping timbers which formed a guide, and then held tightly by screwing the clamp-rod nuts. After being thus secured another section was hoisted, and lowered down upon No. 1. The two sections were then bolted together, a packing of lamp-wick dipped in a composition of white and red lead having been placed between the flanges. After the two sections were bolted together, the clamping rods were loosened, and this portion of cylinder was allowed to slip down between the clamps, and another section bolted on as before. The operation was repeated until the bottom of section 1 was within a short distance of the river bed, and generally five 10-foot sections were thus bolted together. Upon the upper or last bolted section the "air-lock" was attached, which was another cylinder of the same size, but before it was bolted on a cast-iron diaphragm with bolt-holes was put on top of the section last in place. This formed the floor of the air-lock. It had a centre manhole, having a valved door opening downwards with an air-tight rubber washer, and three perforations for the air-supply pipe, the water-pipe, and the equalising pipes, these being of ordinary gas-pipe 3in. diameter. If found necessary to sink the column through a considerable depth of material overlying the rock, other sections were added directly on the top of upper diaphragm and the air and water pipes lengthened. The operation of dropping the cylinder upon the river's bottom was a tedious one in some cases. As we

have seen, the clamps acted as guides, and it was only necessary to loosen the nuts to allow the column to slip down slowly, penetrating the mud as far as its weight permitted. When the column had found a bearing the rods were loosened so as to give a free play all-round cylinder for the rise and fall of tide. The next operation was to remove the water from the inside of the column. For this purpose the floor of the airlock was secured, cutting off the outer air from the working chamber below it, the stop-cock of the air-supply pipe from "compressor" was opened, and the compressed air was allowed to pass from the reservoir into the working chamber. As the air-pressure increased inside, the water was forced out from below the bottom of the cylinder until it was empty. If the cylinder became imbedded in a stiff and impervious mud the water had to be forced out through a water-pipe over the top of column. Having evacuated the iron column of the water, the working gang descended into the "airlock," the upper door was hauled up and tightly closed by an outside watchman, who gave a signal upon which the inside foreman opened the valve of the equalising-pipe by which the compressed air from the working chamber was admitted into the lock. As soon as the pressure was equalised on both sides of the lock door it was opened and the gang of two or four men, according to the size of cylinder, descended by means of a rope ladder, and commenced excavating the material found inside the column. Twenty bags of $1\frac{1}{2}$ cubic feet each were filled and hoisted into the lock per hour by light block and fall tackle suspended from the upper door. Candles were used to give light in these dark chambers, and the compressor was kept at work supplying fresh air and driving out the vitiated during the time the men were engaged. About $3\frac{1}{2}$ hours the men were employed in excavating the material, after which they ascended to the air-lock, closed the door, restored the air within to the normal atmospheric pressure, the upper door was again opened by the watchman outside, and the gang consumed the remainder of their 4-hour shift in hoisting and emptying the bags of *débris* stored in the air-lock. If the inside material was all removed to the bottom of cylinder, a fresh sink is made by allowing the compressed air to escape, and the water to fill again the working chamber. The rush of water through the bottom of cylinder loosens fresh soil, the lifting power exerted by the compressed air is exchanged for the normal weight of cylinder, which accordingly sinks a further distance into the bed of river. Sometimes the settlement is sudden, and as much as 6ft. at a time; in some cases the cylinder will strike a boulder or other obstruction, and a sudden lurch throw the column out of perpendicular. In such an emergency guys were employed to right the column. In sinking a large cylinder 7ft. 9in. inside diameter, it is obvious a considerable lifting force or upward pressure of air against the diaphragm would be created, and this had to be counter-weighted by a wood platform built low down inside the column, and loaded with stone; yet not to interfere with access to the bottom a central shaft was left 3ft. square, and the annular space filled with the rubble. The stone was afterwards used in filling up the column with masonry. Deducting the weight of the seven sections of an 8ft. column, 38,000lb. remained to represent the lifting power of the air-pressure. The pier columns having been thus driven down to their bed, they were secured to the levelled rock by cast-iron brackets with bolts into the rock, from 8 to 16 brackets being used according to the size of column. The columns were afterwards filled to the top with rubble masonry laid dry, and well grouted with hydraulic cement grout every

3ft. in depth, and the first 10ft. of masonry were laid under pressure. This height of stonework was found sufficient to seal the column against the entrance of water from below, after which the pressure was removed, the water and air-pipes removed, and the masonry filling continued in the open air. The grout employed was of one measure of the Rosendale cement to 2 of sand for the remaining portion of filling. We cannot go into other detail. The weight of the bridge was thrown entirely upon the masonry, the upper surface of which was levelled and dressed off. We may add, however, that the rate of progress in sinking the cylinders was quick, as it took 218 hours from the sinking of the larger column to the rock to laying the masonry under pressure. The effect of the compressed air on the men was injurious. Three men of dissipated habits suffered from a partial paralysis of the lower limbs, and were sent to hospital for some weeks. The hot sun shining on the smaller cylinders added to the heat of the compressed air in the confined space caused bleeding at the ears and nostrils, and short hours became necessary. Among the precautions taken, a code of signals was adopted to communicate between the men inside and those on the outside of the cylinder; a watchman was always on duty on the top of air-lock during working hours, and the code consisted of a system of taps upon the side of cylinder with a hammer. Mr. Stauffer hints the value and economy of the telephone in submarine works of this nature, thereby saving the time of messengers, and its application to such undertakings is merely a question of time.

ARCHITECTURAL MOSAIC.

IV.—MODERN MOSAIC.

THE decline of Mediæval Mosaic was due to several causes, among which may be specified—the incongruity of its sparkling and extremely picturesque glass tessellation, and its wealth of colour, with the classical severity of the revived Vitruvian style, to which we may add the want of freedom and utter conventionality of design into which the Byzantine artists and their imitators had fallen. Marble Mosaic also fell into disuse, partly from the same causes, and also from the fact that the hard porphyry and serpentine marbles became more and more costly to procure, and more expensive to work. For these reasons mosaic was almost entirely superseded by fresco painting, and the incrustation of walls with highly-polished marble slabs. The only considerable building in which the mosaic art has been practised without interruption down to the present day is St. Peter's, at Rome. But even there, as we have said, its introduction was due not so much to its selection for its own intrinsic merits, but through the discovery that frescoes would not withstand the dampness of the dome, and mosaic was chosen as the only style of art likely to endure. It was, as Ghirlandaio, the artist, said, "painting for eternity." Its introduction at St. Peter's certainly helped mosaic to retain its place as a practical, living art, but no more. It was very little practised outside Rome, and the Roman artists—of whom a school of instruction was specially founded in the seventeenth century—beyond the necessary repairs of their own cathedral, did little more than practise the minute, gem-like style of mosaic, which for artistic finish, for fine gradations of colour, and delicacy of light and shade, can hardly be distinguished from the paintings themselves of the great masters whom they copy. But these minute works, however admirable in other respects, lie outside our present subject of Architectural Mosaic, which depends for its excellence rather upon broad—nay, even coarse—effects than upon delicacy and finish.

The modern revival in this country began in the manner detailed in our first article.

But it may be questioned whether we should have gone any further in the development of mosaic than in the construction of pavements in ceramic tesserae, had it not been for the impulse which has come from abroad, and for this the greatest honour is due to Dr. Salviati, of Venice. It was he who discovered and encouraged the artist-workman, Lorenzo Radi, almost the only survivor of the old race of Venetian artists who had traditional knowledge of the secrets of "smalto"-making, which in former ages had lent such glory to St. Mark's. Dr. Salviati laboured with all the zeal of an enthusiast. He sacrificed personal interests, abandoned his own liberal profession, and unassisted, and with a very small capital, founded his establishment for the revival of the glass manufactures of Venice, among which he made glass mosaic a main feature; and under both Radi and his nephew, Giovanni Albertini, the old processes are practically revived and improved upon. The school of mosaic at Rome has not made much progress itself, but has a thriving offshoot at St. Petersburg, at the Imperial Glass Works, under the control of the Russian Government. This great mosaic establishment is more especially under the patronage of Prince Garkarin, and the superintendence of Signor Bonafede, pupil of Chevalier Barbetti, the great modern mosaicist of Rome. The are also considerable mosaic works in connection with the cathedral of St. Benedetto, at Monreale, in Sicily. France nor Germany, so far as we can ascertain, have any native manufactures of mosaic. The mosaic medallions in the New Opera House at Paris were the work of Salviati, and the latest mosaics at Berlin, of which we have any account, were also by him. They were colossal figures, intended for exterior decoration, and excited great attention at the Vienna Exhibition. An attempt was made to establish a school of mosaic at Paris in the year X. of the Republic, also to introduce mosaic work as an employment for the deaf and dumb, but both were doomed to failure. In England, we are glad to say, we are not entirely dependent upon a foreigner, although many of our greatest mosaic works are by Dr. Salviati. Mr. Rust claims to have been the first English manufacturer who undertook the preparation of the "smalto," under a patented invention of his own, of which the following is his description, and which it will be interesting to compare with the ancient methods previously described:—

Glass (old, broken, or waste by preference, for cheapness) is first pounded or reduced to powder, or it may be melted in a crucible or furnace. With this is mixed as much sand as it will take up, together with colouring matters or pigments; these materials are then melted together, and the articles so produced, whether slabs or blocks, or decorative designs, or other objects, may then be polished by means of iron and wooden polishing wheels as used for polishing glass. The proportions of sand and glass used by preference are: glass, 1 cwt.; sand, 30 to 40 lbs.; but the proportions may vary from 20 per cent. of sand to equal parts of sand and glass; the quantity of sand used for pavement work, or for the higher parts of buildings, or for a *recedos*, should be greater than that used for decorative objects or parts of a building nearer the eye of the spectator. The sand mixed with glass and colouring matters gives an appearance of stone, the materials being in the furnace or crucible for about six hours; but if they are left for a longer time the spots or specks giving the mottled appearance of stone would disappear, and the material resulting would be uniform in colour. Barytes, strontian, magnesia, or other earthy matter may also be used instead of or in conjunction with sand; but sand is the cheapest, and preferable to the others.

In order to colour the material a small quantity of oxide of cobalt will give the pattern and colour of lapis-lazuli; oxide of copper will give brown, dull red, green, or iron colour, according to the quantity used; oxide of iron will give a yellow or amber colour, and oxide of manganese a purple and grey or brown; the light and dark green materials mixed in the crucible will produce the shades for malachite, and the lapis-lazuli will be produced by a similar mixture of light and dark blue. Imitations of marbles with serpentine colours or veins may be produced by mixing the colours in the crucible or pot at one time, and moulding them into shapes and forms; other colours or mixtures may be produced by the use of suitable oxides or pigments.

The first artistic work executed with the above materials was the picture of "Palissy the Potter," exhibited at South Kensington, in 1867. Since that time they have been used for the decorations of Manchester Town Hall, for some of the pavements and the grand staircase at South Kensington, and at the present moment the very extensive mosaic decorations in the chapel of Sandhurst College for the Government, are being executed also in the same material. A fine opportunity now exists for comparison of this and other purely English work with that of Salviati at South Kensington, where the different specimens are placed side by side. Among Rust's works now to be seen there, may be mentioned a head of Daniel the Prophet, intended for one of the spandrels of the dome of St. Paul's, where we may hope one day to see it side by side with the splendid works of Salviati already there. In Messrs. Rust's atelier, at Lambeth, may also be seen a mosaic of moderate size, representing the Gospel story of the tribute money, and which at a very little distance might easily be mistaken for an oil painting. This minute-work however, we may again say, is a little outside the legitimate field of architectural mosaic. English glass mosaics by other eminent workers may also be seen and compared at South Kensington.

We now propose to explain as far as possible the various technical processes at the principal modern manufactories abroad. The following account of the mode of manufacturing the "smalto," or mosaic material, at Rome, may be taken as a type of the method everywhere else. The enamel consists of glass mixed with metallic colouring matter, and is heated at the manufactory for eight days in a furnace, each colour in a separate pot. The melted enamel is taken out with an iron spoon, and poured on a polished marble, placed horizontally, and another flat marble slab is laid upon the surface of the melted enamel, so that the enamel cools into the form of a round cake of the thickness of 3-10th of an inch. To divide it into smaller pieces it is placed on a sharp steel anvil called *taghiolo*, which has the edge uppermost, and a stroke of an edged hammer is given on the upper surface of the cake, which is thus divided into long parallelopipeds or prisms, whose base is 3-10th of an inch square. These again are divided across their length by the *taghiolo* and hammer, into pieces of the length of 8-10th of an inch. The cakes are sometimes made thicker and the pieces larger.

For smaller pictures the fused enamel is drawn into long parallelopipeds or quadrangular sticks, and divided by *taghiolo* and hammer or by a file, sometimes by a copper blade and emery; sometimes polished on a horizontal wheel of lead with emery.

The beauty, softness, and great variety of colours, with the requisite degree of opacity, purity, and solidity of the mosaic material, are dependent on the quantity and quality of the mineral substances employed for colouring, and the continuance and degree of heat in which they are fused together; and if these processes be imperfect or irregular the appearance and durability of

the mosaic will be affected. If the paste be not well and carefully elaborated, or if the mineral elements be not exactly proportioned, so that either the paste is transparent or some other defect ensues, then it is utterly impossible that the enamels can properly reproduce the painting, for the colouring is uncertain, weak, and almost lost through the transparency of the materials. In this state mosaic is liable to injury from dirt, damp, smoke, and all atmospheric changes.

To produce gold and silver enamels great knowledge and experience are necessary. On a ground of thick glass or enamel, according as it is desired to render the gold enamel transparent or opaque, or to give it a warm or variegated colour, there is laid a leaf of gold or silver, which is attached chiefly by the action of fire; then a film of the purest glass is spread over it, and this may be either perfectly colourless or of any tint that may be required. When well made these three layers become one homogeneous body. But here is the difficulty: it is important that the surface of the mosaic should present no inequalities; if it be uneven the eye will catch the glitter of the glass, not the brilliancy of the metal, and the mosaic will look as if it was varnished over. To prevent all this the most extreme care is required in spreading the delicate film of gold without creasing or breaking, and also in the subsequent operations to prevent its being disturbed, torn, or crumpled. Another difficulty is to prevent the introduction of minute air-bubbles, which would sooner or later separate the glass from the metal, and further to avoid striæ in the covering glass. All these difficulties, of course, very much enhance the price of gold and silver mosaic, which is usually at least double the price of other colours.

The following description of the Russian works at St. Petersburg, being carried on exactly after the Roman model, will serve for a general idea of both Roman and Russian methods, and will serve to show very clearly why the more elegant and simple methods of Salviati and those practised in England are cheaper and preferable in every respect:—The atelier at St. Petersburg consists of one large hall, about 50ft. by 30ft., with a small gallery on brackets running round it, on which are cases of pigeon-holes for storing the *smalts*; these are arranged in the order of their colours and shades, which are said to number more than 12,000. The preparation of large pictures is carried on upon the floor of this hall, and the *smalts* are close at hand in the gallery above-mentioned. Besides this, there are other rooms on the ground-floor for preparing the wooden frames, mixing stucco, and other operations; and above are apartments in which small mosaics are made, for tables, &c., and for producing the very small tesserae used in such works. The first operation in preparing to copy a large picture in mosaic is to draw it on paper or canvas in outline; then it is divided by lines into squares the size of the tesserae, and these are coloured in with water-colours. A very strong wooden frame is then prepared, sometimes of balks, 5in. in thickness, and about 6in. or 8in. in depth, well clamped with iron at the angles. This frame is laid on a smooth stone table, and is filled with mixed plaster of Paris, which is then left to harden and dry, after which it is turned over, and the surface which was next the smooth table is found to be nearly perfect, and is rendered quite so by scraping and other operations. Upon this an outline of the picture is then drawn, and lines ruled at right angles so as to form squares corresponding with those on the cartoon, and the artist proceeds to set the tesserae. In order to do this he begins to cut out the stucco within the outlines of the drawing, one square at a time, sufficiently deep to take a quantity of mastic, made of

powdered marble and oil, into which he presses the tesserae, keeping the upper surface perfectly level; in this way he works through the whole picture, which is then turned over, and laid with its face to the stone table. All the stucco is then carefully removed from the back until the rough under-surfaces of the tesserae are exposed. Roman or Portland cement is then run in so as to form a solid back to the picture, which after being cleaned is ready for removal to its destination.

The smalts or glass enamels are manufactured at the Imperial Porcelain and Glass Works, and are supplied to the mosaic factory from time to time as wanted. They are in round flat cakes, 4in. or 5in. in diameter, and $\frac{3}{16}$ in. in thickness. A small apparatus formed of six cutting wheels worked by a lathe, the wheels of malleable iron, covered with tin and coated with emery, set at equal distances on an axle, slits the cakes into strips of equal width, and these are then cut transversely or diagonally, as the artist requires, with great ease by means of a file and chisel. Smaller ones are made in the same way, but the smallest are drawn out into square rods and broken to the lengths required.

The Byzantine character of the Russian mosaics involves a great cost, from the large quantity of gold tesserae employed.

In the Salviati process the drawing is made and coloured on paper, an adhesive surface is applied to it, and then the tesserae of comparatively thin glass are laid face downwards and adhere to the paper picture. The back is then covered with mastie cement, which is pressed so as to fill in the crevices between the tesserae, and to form a solid back; the whole of the back and sides are then inclosed in a zinc case, and the whole becomes a perfectly firm plate, as compact as a slab of marble, and only $\frac{3}{16}$ in. in thickness, instead of 10in. or 12in., as in the case of the Roman and Russian mosaics, and weighing hundredweights instead of tons.

When contrasted with the costliness and ponderous weight of the Russian and Roman method of producing mosaic work, that of Dr. Salviati is as one to twenty. His grand picture of Minerva, at the entrance to the Italian Fine Arts Court at the Vienna Exhibition, attracted very much notice, and illustrated the gigantic dimensions to which his work can go. A mosaic of equal size by the older methods practised at Rome and St. Petersburg would weigh at least 20 tons, and would render special structural consideration necessary in any building on which it had to be placed, whilst it did not weigh probably more than 2 tons, and was without anxiety trusted on the walls of a temporary building.

The English methods of combining the mosaic fragments into patterns is to all intents and purposes so very similar to that of Salviati, that a description of them is unnecessary.

We next propose to treat of modern marble and ceramic mosaic work.

GOLD AND SILVERSMITHS' WORK.*

A HANDBOOK under this title has been issued by the Education Department of the South Kensington Museum. It is written by Mr. John Hungerford Pollen, M.A., the author of "Ancient and Modern Furniture," and is illustrated with several wood-cuts. Glancing over the pages of the work, we find the subject—a large one—has been treated in a popular yet thorough manner, the researches of Mr. Layard, Dr. Birch, Müller, Beckmann, Schliemann, and Mr. Roach Smith having been brought to bear upon the earlier history of the precious metals. The use of gold and silver,

besides mixed metals, by the Assyrians, has been proved by Mr. Layard and Dr. Birch, the latter of whom refers to the silver vases of the Tahai as a "remarkable tribute," and as showing great excellence in working. Again, the walls of Eebatana, 700 B.C., were silvered and gilded in the inner circuits or parapets; here it is thought a mixed metal was used. The masonry of the other walls was stained. The temple of Belus had a golden image of colossal size. This and other recorded statues of gold were, it is thought, made of wood and plated. Phidias and the Greek artists used plates, hammered and engraved. The art of chasing out lines and inlaying a kind of *niello*, or black composition, was well known, and the Greeks, like the Egyptians and other ancient nations, employed gilding largely, not only on metals such as bronze, but on wood and external masonry. In the first case gold was laid on as an amalgam with mercury, the latter being evaporated afterwards. For coating wood or stone, "gold leaf of a tolerable substance was laid on a prepared bed made of chalk, marble-dust, or other composition, with animal size admirably tempered as in modern water-gilding," and sculpture and architectural ornaments were thus enriched. Greek and Roman workmanship is amply treated; the Byzantine revival of gold and silver work, after the decay of Classic art, exhibited a vigorous kind of art; the Classic outlines and details were borrowed; but, as Mr. Pollen remarks, the compositions are heavier and less graceful. Gold was used to excess in the enrichment of the basilicas, altars, chalices, censers, and other sacred vessels, particularly in the time of Justinian. Precious stones, *niello*, and enamel form a large part of Byzantine goldsmith's work, and these kinds of decoration are described. *Cloisonné* and *champlevé* enamels are explained. The author mentions the treasure of gold and precious stones discovered recently near Toledo, in Spain, which affords evidence of the goldsmith's art in that country in the 7th century. Charlemagne was a great promoter of the art in western Europe, and his crown is engraved in Mr. Pollen's handbook. This is still preserved in Vienna. The Saxons were skilled as goldsmiths, and Mr. Roach Smith says, "in artistic merit, in style, and design," their jewels show a closer relationship to classical art than those from other parts. Pendants and necklaces, found in Saxon tombs of the 6th century, exhibit elegant design and workmanship, and the specimens in the Kensington Museum may be referred to. In Alfred's age (9th century) the art was much cultivated; but few examples of chalices, patens, or other utensils are to be seen. Irish Celtic work comprises many ornaments of unsurpassed beauty. The Bell of St. Patrick at the South Kensington Museum furnishes a good example of the plaited and interlaced patterns used, and gold plait-work and frets seem to have been common in surface decoration. The gold and silver work of the 11th and 12th centuries is well known; altar utensils—pyxes, patens, chalices, crosses, reliquaries—were undertaken by artistic Benedictines; and the abbots of Ely and St. Alban, among others, were famed as schools of goldsmiths. Architectural forms were largely copied in the ornaments. The golden altar-front from Basle Cathedral (1003-1024) is one of the engravings given to illustrate this period, and casts of candlesticks executed at Hildesheim by Bishop Bernward are to be seen at Kensington. Among those illustrated we find the elaborate Gloucester candlestick, a work of the early part of the 12th century, showing great spirit in the bands of sculptured figures, birds, and monsters; another, the *albero* of Milan, a seven-branched candlestick of exceeding elegance, made of gilt-bronze. The leaf-work and

bosses which adorn the stem, and particularly the base made up of four dragons, their tails forming volutes round the stem, are beautifully designed and wrought. Mr. Pollen observes—"Most of the reliquaries, whether large gabled-roofed chests or small movable enamelled pieces that could be put on the altar, were made with round-arched niches and colonnades, acanthus-leaf capitals, crestings, and finials in accordance with the architecture of the day. Nor were reliquaries or shrines only made in this architectural spirit. The censers curiously carry out the same type, and were crowned with towers, turrets, and pinnacles, through the windows of which the smoke escaped. A remarkable example is kept in the cathedral of Trèves." The details of ornamentation were always bold and full of invention, though the ductility of metal was kept in view. We observe engravings of chalices of the 13th, 14th, and 15th centuries, many of excellent design; but we pass on. An interesting chapter is that on the seventeenth and eighteenth centuries. It is illustrated by cuts of Flemish, Louis Quatorze, Louis Seize, and Queen Anne examples, with sufficient explanations to render the peculiarities of those styles understood. Electrotype casts of these are to be seen at Kensington. A useful chapter on "Hall Marks" concludes the book, which will be found an instructive popular handbook and an introduction to the connoisseur.

OUR COMMONPLACE COLUMN.

GIRDER (IRON).

A GIRDER may be called, for the sake of distinction, a flanged beam, in which the material most active in resistance is placed in flanges at the top and bottom, while the centre part or the web is thus reduced in substance, and merely unites the two flanges. In cast-iron girders the top flange should not be less than $\frac{1}{8}$ the area of the bottom flange. A length of 25ft. is considered a maximum for cast-iron girders, and they should never be less in depth than $\frac{1}{20}$ of the span. The loads on girders in building are generally of a uniformly distributed character, though in every case the maximum weight should be taken. The size of the girder depends on the weight to be carried and the proportion of span to depth. The most economic proportion is 12 to 1. The rule to find the strain on either flange of a wrought-iron girder, supported at ends and uniformly loaded, may be expressed in words as follows: Multiply the load in tons by the clear span in feet, and divide product by eight times the depth of girder in feet; the quotient will give the strain at centre of either flange in tons. A safe strain of 4 tons per sq. in., both in tension and compression is usually calculated, no allowance being made for loss by rivet-holes, a mode of calculation that really allows 5 tons for tension per sq. in. of net effective area, and 4 tons per sq. in. for compression, considering the effective sectional area of bottom flange (see "Beam"). For further information respecting the theory and the calculations of girders, the reader is referred to various articles in the BUILDING NEWS, Campin's "Treatise on Iron Bridges and Girders," Rankine's, Hodgkinson's, and other works. The term girder is applied to the main beam of a floor.

GLASS.

The essential constituents of glass are silica and an alkali. Glass has been defined as "an amorphous silicate," because it is capable of passing from the vitreous to the crystalline state. The origin of glass manufacture is uncertain, though it is well known that the Egyptians were acquainted with it, and there is a beautiful goblet of glass in the British Museum found among the ruins of Nineveh. Pliny tells a story that Phœnician merchants returning from Egypt to Syria with a cargo of soda (natron), when cooking on a sandy beach, rested their pots on blocks of natron, and found that glass was produced by the heat causing the alkali to form a flux for the sand. Dr. Schliemann discovered discs and beads of glass in the ruins of Mycenæ, though glass was not found at Ilum, nor is it mentioned by Homer. For historical sketches of the art of glass manufacture we refer the reader to Mr. Alex. Nesbitt's Handbook on "Glass," pub-

* Gold and Silversmiths' Work. By JOHN HUNGERFORD POLLEN, M.A. London: Chapman and Hall, Piccadilly.

lished for South Kensington Museum, recently reviewed by us; also to articles in Ure's Dict. of Arts, the "Encyclopedia Britannica," and "Chambers's Encyclopædia." "C. W." sends the following contribution on the manufacture of glass:—

Glass is made from a mixture of flint, sand, or broken glass (silica), and soda or potash (alkali), with lime, nitre, oxide of lead or manganese in varying proportions, melted in pots by exposure to the heat of a furnace. The principal varieties in use for glazing and other purposes in connection with buildings are *plate*, *crown*, and *sheet* glass. Each variety is usually divided into three or four different qualities, and further described by the weight per foot superficial, by the thickness, or by the finish of surface. *Plate* glass is made by pouring some of the melted glass on to a metal table previously heated, where it is rolled to the proper thickness. When sufficiently hard the plate is removed to the annealing oven and gradually cooled. The size and thickness of sheets procurable is practically unlimited. The usual thicknesses are $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$; they may be obtained rough or rolled smooth, with a plain, fluted, chequered, diamond, or quarry pattern on surface, or ground and polished. *Crown* glass is obtained by blowing a small quantity of melted glass into a globular form by means of the tube or blow-pipe, it is then attached to a rod, the tube and neck of globe being cut off. The rod is held horizontally and rotated in front of a furnace. When the glass is reheated, the centrifugal motion is continued until the globe flashes out into a circular disc or table about 4 feet in diameter. The table is afterwards annealed. From the method of manufacture the thickness varies considerably even in the same table. The usual thicknesses run from 1-20th to 1-15th of an inch, weighing from 10oz. to 16oz. per foot super. *Crown* glass is sold in crates containing 18, 15, or 12 tables according to thickness, each table running from 4ft. to 4ft. 6in. in diameter; it is also supplied in slabs unflattened or flattened, with 24 or 26 in the crate.

Sheet glass is first blown in a hollow cylindrical form with closed ends, which are cut off, and the tube cut parallel to axis is placed in an oven with the cut uppermost, where the glass as it softens spreads out by its own weight. It is afterwards dressed if required and annealed. Annealing in water or in boiling oil is said to diminish the fragility of this kind of glass, especially with the latter process. When dilated by heat the oil enters into the composition, imparting a certain elasticity and toughness to the glass. Sheet glass can readily be obtained in sheets containing about 20ft. super., and up to $\frac{1}{4}$ of an inch in thickness, the usual thicknesses weighing 15oz., 21oz., 26oz., 32oz., and 36oz. per foot super. It is sold in crates of stock sizes, containing a certain number of sheets according to thickness. Sheet glass can be obtained flattened or bent to any shape or form, either colourless, polished, fluted, chequered, obscured or ground, enamelled, embossed, tinted, stained, or coloured, with combinations in figures or colours of endless variety. The colours are known as "flushed" when burnt in on the surface. Pot-metal colours are added to the glass when melted in the "pots." In 1875 M. de la Bastie succeeded in removing the brittleness of glass by suddenly plunging it into a bath of oil when the glass was at a cherry heat.

The colours employed in glass manufacture are yellow from charcoal, antimony, or silver; red from sub-oxide of iron, oxide of copper and from gold, protoxide of iron; green from protoxide of iron, oxide of copper, of chromium; blue from cobalt, also from iron; amethystine from manganese; brown from do.; orange from peroxide of iron, with chloride of silver; black from scoria of iron or charcoal.

GLASS PAINTING.

For information on this subject we refer the reader to various articles in the BUILDING NEWS: J. B. Waring's "Arts Connected with Architecture: Stained Glass, Fresco, &c., in Italy"; Warrington's "History of Stained Glass"; C. Winston's "Inquiry into the Difference of Style in Ancient Glass Paintings, especially in England"; also his *Memoirs* illustrative of the art; &c.

MODES OF COLOURING GLASS.

There are three modes in use:—(1) That in which the colour is mixed up with the molten mass, called "Pot-metal glass"; (2) that by uniting a thin layer of coloured glass with another layer, either plain or coloured, called

"flushed" or "coated" glass; (3) that in which the colours are painted on and burnt in, as in painted glass. "J. A." writes, as regards the latter:—The mode of procedure is as follows: The design having been first drawn on paper, the glass is laid thereon, and the outline traced with a coloured fusible glass. The parts intended to be yellow, orange, or red are then coated on one or both sides, according to the tint required, with a mixture composed of silver, antimony, and oxide of iron. The glass is then exposed to a red heat, in which process the tracing colour is fused and adheres permanently to the glass. The mixture of silver and antimony stains the glass, but does not melt; so that the oxide of iron, which is in the state of dry powder, may be brushed off, leaving the glass coloured, but as transparent as before.

PRINCIPLES OF GLASS PAINTING.

Certain principles, as regards design and colour, should govern glass for windows. Among these are, that the subjects should be chosen with respect to the architecture and window tracery; that the drawing should be simple in outline and conventional in treatment; that the colours should harmonise, and not be too heavy in tone; that relief or shading should be avoided, as contrary to the object of window-colouring. The earliest stained glass, such as that at Canterbury, shows lozenge, circular, and other shaped glass painted with Scriptural subjects. In the Early English period foliage, scrollwork, and diapered patterns appear; quarries were introduced in which emblems, leaves and flowers were painted. Figure-subjects, with canopied niches, succeeded in the Decorated period, and geometrical designs gave place to pictorial and natural subjects, and glass-painting ultimately fell into the error of imitating pictures, losing sight of the character of transparent colouring. (See Viollet le Duc's "Dictionnaire Raisonné.")

GLASS MOSAIC.

Several kinds of glass mosaics are in use: there is *Roman Mosaic*, composed of small pieces of enamelled glass, called *smalto*; *Venetian Mosaic* is composed of irregular pieces of all colours, the ground being gold; *Opus Grecanicum*, in which small cubes of coloured *smalto* are inserted in grooves of white marble, about half-an-inch deep, in geometrical patterns. Dr. Salviati's Venetian mosaic has been largely employed, and the process is inexpensive. Similar kinds of glass mosaic of irregular cubes are known as Stevens' Mosaic and Rust's Glass Mosaic.

GLAZING.

We refer the reader to Gwilt's, Hurst's, and other works for general information upon this trade. For fixing glass to stone mullions, a mixture of Bath-stone dust and linseed oil, made like putty, is recommended as elastic, and more waterproof than Portland cement. It withstands settlements. Saddle bars are usually placed in old windows from 8 to 9in. apart. Short intervals are to be preferred. Iron standards also are necessary in wide windows, with patterns, and even in picture windows, if they do not cut the principal figure (see Winston on "Glass Painting.") We may refer here to a new and much improved system of glazing for roofs and skylights, called Helliwell's system; for particulars, see article in BUILDING NEWS, page 543, Vol. XXXIV. See also Rendle's Patent System, both of which obviate the evils of contraction or expansion, and putty joints.

"GLORY."

The glory is the circle of light usually painted round the heads of angels, saints, &c. M. Didron, in his invaluable "Christian Iconography," gives a most detailed history of the glory, its nature, origin, and character. He says, "the term glory is employed to express the union of the nimbus (vide infra) and aureole."—C. F. W.

GLYPHS.

Glyphs (from Gr. *γλυφειν*, to hollow out) are the vertical channels with which the Doric frieze is ornamented. In the Greek Doric they are worked from the angle of the entablature, whilst in the Roman they are worked from the axis of the column. The glyphs are cut angularly, and are generally grouped in threes, and hence called triglyphs. The spaces between the channels are flat and narrow.—C. F. W.

GORGED.

A term used in heraldry to signify that the neck

of an animal, &c., is encircled by a band, coronet, &c.

GOthic ARCHITECTURE.

The term Gothic is used (in an architectural sense) synonymously with Pointed. Professor Parker says that the term was given as a reproach and contempt at a time when it was the fashion to write Latin, and applied to the Mediæval styles at the time of the Renaissance of the Pagan orders:—

"Denique nil sapiat Gothorum barbara trito
Ornamenta seculorum et monstra malorum."

The term Gothic is, however, frequently used in its broadest sense, including the Romanesque. Schlegel, in his "Principles of Gothic Architecture," to which the reader is referred, says:—"The general title of Gothic architecture, if that great national name be taken in its widest sense, for the old Christian and romantic style of the Middle Ages, from Theodoric down to the present time, is decidedly the most appropriate, and must ever be retained." In treating of English Gothic, it is more convenient to do so under the different periods to which its varied forms belong. Thus (1) the Early English, or First Pointed, 1200-1300; (2) Decorated, Second or Middle Pointed, 1300-1400; (3) Perpendicular, Third or Late Pointed, 1400-1500. It must be borne in mind, however, that the last quarter of the century is passing on towards the style of the succeeding century.

Gothic architecture is intensely ecclesiastical. To study its origin will be to study the history of religion. We must not, however, confine ourselves to merely English Gothic, but must consider also the form it assumed in France, Germany, Spain, and Italy. In this last country it never rose to its purest form. Classicism was always uppermost in Italian thought.

In its fancy Gothic architecture was a universal style, free from national characteristics. At length, however, it was moulded (so to speak) to the particular climates and requirements of the people.

In Classical architecture horizontalism, the static force, is the pervading feature; whereas in Gothic verticalism the ever-striving upwards, the dynamic force is the all-pervading idea. The Gothic is realistic or naturalistic, and hence is free, and progresses unfettered. Its forms are copied directly from nature. The capitals are clusters of foliage and flowers. The finials, corbels, crockets, brackets are in many instances direct imitations of nature, as we have already seen (FOLIAGE).

Undoubtedly Gothic architecture owes much to the monks, and it is a moot point whether the poets influenced the mediæval artists, or *vice versa*. Dante's great poem has been aptly compared to a Gothic cathedral: *Inferno*, the crypt; *Purgatorio*, capitals, corbels, &c.; *Paradiso*, the upper parts, with wall-paintings of Biblical scenes.

Speaking of Early Gothic, M. Caumont remarks: "At the beginning of the thirteenth century architecture is imprinted with a physiognomy which repels the former style; it is not, however, until the middle of the 13th century that it acquires lightness, elegance, and pleasing proportion, which give so much superiority to the First Pointed style over those of later centuries."

We may refer the reader to the works of Fergusson, Rickman, Sharpe, Paley, Scott, and Parker on English Gothic; Wilson on Scotch; Petrie and Stokes on Irish; V. le Due, Agincourt, Caumont and Gayer-Beau on French; Hittorf, Oüté, and Schnase for German; Pugin and Cotterill for Spanish Gothic architecture.

C. F. W.

VENETIAN ART.

THE fourth of a series of lectures on the "Art of Italian Renaissance," was delivered on Saturday by Dr. John Todhunter, in the New Museum Buildings, Trinity College, Dublin, the special topic being Venetian art. They had to study to-day, he said, the rise of art in a new centre, to a great extent independent of the influence of Pisa, Florence, or Siena. As early as the 11th century Venice had made her mark as a great maritime power, while in the 12th century she had become the mistress of Eastern commerce and the banker of Europe. In the 14th and 15th centuries she was in the height of her affluent prosperity, though Mr. Ruskin dates the beginning of her spiritual decline as early as 1418. The characteristics of

Venetian art are as different from those of the art of Florence or Siena as her political history is from theirs. The feverish changes not only in government but in principles and methods of government which astonish and puzzle us in the history of most other Italian cities are at least much less prominent in the history of Venice. The Florentines, like the Athenians, or the French of the Revolution, lived in a whirlpool of new ideas; their political life was a series of catastrophes and metamorphoses; the eager and subtle Florentine mind was constantly planting new ideas, as children plant slips of whatever takes their fancy in their gardens, to be grubbed up again before they have had time to germinate in the ill-prepared soil. The Venetians had something of the ponderous adhesiveness and conservatism of the English. They were practical rather than theoretic, and instead of splitting into murderous and suicidal factions, they consolidated into a homogeneous state, with an intense insight into their own material advantages, which Mr. Ruskin very aptly compares to "our own" English temper. With a distinct reference to England he further notices the strange phenomenon presented by the Venetians in their private religiousness and public want of religion—as if there ever was a State whose policy was religious, except when religion has taken the form of fanatical conquest, as the Mohammedan invasion of Europe and the Christian crusades! But, be this as it may, we find in Venetian painting something of the same homogeneity that we find in Venetian politics. The spirit of Venetian painting is in the main neither Christian nor Pagan, but simply Venetian—that is to say, imaginatively sensuous—the rich decorative art of a practical people, with a splendid sense of beauty, not much affected by hobbies of any kind—classical, anatomical, or scientific. The Venetian painters were painters for excellence, who, having obtained from Germany the art of oil painting, rapidly mastered this, and brought it to such a pitch of perfection as has never been equalled. The Venetian school was from the first a colour school; from the time when the modified Byzantine architecture was incrustated within and without with gorgeous mosaics and variegated marbles, and the city began to shine with gilded pinnacles and painted domes. There was something Oriental in the mistress of the East herself—this city, where the Byzantine, Gothic, and Italian imaginations met and mingled. The early Venetian painters carried down the Byzantine traditions to a much later period than the painters of any other of the Italian schools. They remained unaffected by the influence of Giotto until, as late as the middle of the 15th century, a new school of painters, influenced by Gentile da Fabriano, sprang up, not indeed in Venice itself, but in the neighbouring island of Murano. This Gentile da Fabriano was an Umbrian painter, and a pupil of Fra Angelico, whose art, as compared with that of his Florentine contemporaries, was of a very debased kind, outrivalling the Siennese painters in profusion of barbaric ornament, had just the qualities to captivate the Venetian mind, and to him is attributed the change of style which began with the Vivarini in Murano and Jacopo Bellini, the father of Giovanni, in Venice. Having glanced at the history of the Vivarini, the barbaric stucco ornamentation of the elder Vivarini, and the advance in colour and oil-painting by Bartolomeo, and of the works of their disciple, Crivelli, whose works are an interesting epitome of the changes of Venetian art, from the Byzantines to the Bellini, the lecturer came to speak of the two Bellini, who took the torch of art from the Vivarini and carried it through the 15th century down to the times of Giorgione and Titian. After an ample account of the lives and works of Jacopo and Giovanni Bellini, and of their most distinguished followers, Carpaccio and Cima. The school of the Bellini is of great importance in the history of painting, if, for nothing else, because even the smaller men were at least masters of oil-painting, who were perpetually trying slight innovations, perfecting the process and discovering new capacities in the art. There is probably not one of them who has not left a few pictures of such beauty that they have been attributed to one or other of the greatest men with some plausibility. At this time in Venice the secret power of that sleeping beauty whose name among men is Colour, was discovered, and everyone crowded in for a share of her kisses. The next lecture, which will be delivered on

Saturday week, the 19th inst., will be on Montegna, Sizzorelli, and the other great pioneers of the perfect Renaissance art of the 16th century.

SUBURBAN BUILDING MATERIALS.

UNDER the head of "Legal Intelligence" we gave a brief summary last week of a case heard before Mr. Bushby, at the Worship-street Police-court, on the 27th ultimo, in which Mr. Henry Shipp, a builder, was summoned by the District Surveyor for East Hackney (South) and North Bow, for using improper mortar. Upon very clear evidence of the nature of the rubbish which had been employed, the magistrate ordered the works to be pulled down. An amusing feature of the case was that the district surveyor, Mr. Gould, produced a lump of material which the builder's own witness, Mr. Knight, a surveyor, who doubtless imagined it had been procured from the work, pronounced it to be "very good, and he thought better perhaps than the specimens he had produced himself." We can imagine Mr. Knight's astonishment when Mr. Gould announced that this good mortar was "a lump of mud from the canal adjoining." The nature of the mortar introduced into too many of the "neat villas" on the outskirts of London is, however, beyond a joke, and we are glad to find that surveyors are looking sharply after the speculative "jerry-builders." At the Edmonton Petty Sessions, on the 31st ult., another builder, Mr. A. Jukes, was summoned at the instance of the Tottenham Local Board of Health for violating their 104th By-law, "inasmuch as he had begun to erect four dwelling-houses, the foundations of which did not rest upon solid ground, or upon concrete, or other solid substructure." These houses were situated in one of the new roads near Finsbury-park, a district which is just now being built over at a most prodigious rate. In fact, we were told that one estate there is being covered at the rate of a house per day. It appears from the evidence of the Tottenham surveyor, Mr. de Pape, that a trench 6in. in depth was dug and filled in with earth, stones, and improperly burnt clay. Cement was said to have been used in the proportion of 7 to 1, but it does not seem that much cement was visible in the sample produced in court. The concrete was, in fact, composed of dry, soft rubbish, and Mr. Crowne, the clerk to the Tottenham Board, who prosecuted, said "the samples that had been produced were in his opinion the strongest testimony that could be adduced in justification of the prosecution." The question of what thickness of concrete is sufficient to form a "solid substructure" came incidentally before the Bench, and Mr. de Pape, while he considered that on that particular ground (a stiff clay) 9in. of concrete in a trench 6in. deep was enough, said that, as "it was better to keep houses up than down," he should prefer as a general rule "concrete foundations to be at least 12in. deep." The builder who stated that he had built 600 houses in Barrow-in-Furness without any concrete at all, and seemed quite hurt when fault was found with him, admitted that he had disregarded the warnings of the district surveyor, and proceeded with the work in spite of the exception taken to the materials. He was fined £5 and 40s. per day for ten days, during which he had gone on in defiance, making £25, and 6s. 6d. costs. Mr. Abbiss (the chairman), in delivering sentence, said—and we feel we are justified in giving the widest possible circulation to his observations—"I hope it will go forth through the Press that we are determined, as far as we can, to put an end to the system of setting the by-laws of the Local Board at defiance, and to set our faces against the erection of a description of houses that must immediately they are built, or very shortly afterwards, become unfit for human habitation. If, after this intimation, builders will use improper materials, they must take the consequences." The magistrates seem to have shrunk from condemning the houses to be pulled down, as the builder said this course would ruin him. One of the magistrates on hearing this said:—"You talk of being ruined, but what about those who buy houses built upon such foundations?" It is this view of the case which is the saddest one; houses of the class so roughly handled by the Tottenham magistrates are being built in thousands in the north of London, and it is only very lately that fate has overtaken the miscreants who build them. We

have over and over again pointed out the risk that is run in buying houses of this type, meant only to sell. As Mr. Jukes shrewdly stated:—"If the work is passed, and the purchaser buys the house with his eyes open, that is his business;" and, in spite of all that can be said, people will buy and lease houses so bad as scarcely to be fit for human habitation. Ruskin talks of houses that "spring up in mildewed forwardness out of the leached fields about our capital," and this is a true picture of what indeed takes place. On a good clay soil the builder will erect a whole row of houses with a few loads of lime, and a large proportion of the mortar owes all its lime to the shaking out of an empty lime-bag over a heap of crumbling ballast. It is not only that the materials are bad; the way in which they are put together by a class of workmen rejected by all the better class of employers, and as many boys as can be crowded on to the job, is worse; and we only hope that all the authorities round London will be as vigilant as the Tottenham Board, and combine to stamp out a class of speculators who have had their day quite long enough.

VARIETIES OF BUILDING TIMBER AND THEIR DISTINGUISHING FEATURES.

THE varieties of timber in general use are not easily distinguished by those who have had little experience in building operations; and the constant question made in our pages as to the characteristics of different kinds of timber, show the difficulty experienced by some young architects and builders. In the newly-issued volume published by the Council on Education, "Notes on Building Construction," the information given under this head is somewhat imperfect. Thus, in reference to Dantzic timber (grown chiefly in Prussia), all the information conveyed as regards appearance is stated as follows:—"Its general appearance answers to the description given by Tredgold of the northern pine (*Pinus sylvestris*), though in colour it is rather whiter than other varieties." The "timber is strong, tough, elastic, easily worked, and durable, if well seasoned." These descriptions do not give the student the exact kind of knowledge about the appearance he requires; and, after all, to convey minute distinctions of colour, grain, and quality, is not an easy matter. A week at the workshop would, in this respect, be well spent by all students who wish to discriminate accurately: as some knowledge of quarries and masons' yards is necessary to distinguish the varieties of Bath stone. The following information may be found of service, however, and we extract it:—"The best balks of northern pine are imported from Dantzic, Memel, and Riga. Dantzic balks are from 18ft. to 45ft. long, and generally 14in. to 16in. square. The deals vary from 2in. to 5in. in thickness, and in length from 18ft. to 50ft. Major Seydon, in 'Notes on Building Trades,' observes the private marks on Dantzic are much more numerous than on Memel or Riga timber. All balks of crown quality are marked with an indented crown. Dantzic marks are lines scribed about the centre of each balk with short crossed lines. For best middling only the centre mark is used, for good middling only the two outer marks, and for common middling all those marks are made. Memel timber is very similar to Dantzic, but is considered hardly so strong. The scantlings of balks are smaller, being from 13in. to 14in. square. Riga timber is like the other varieties just described, but the annual rings are closer. It is slightly inferior to Dantzic in strength, is remarkable for its straight growth, for the small proportion of sap it contains, and for its freedom from knots. It is, however, frequently a little shaky at the centre, and is, therefore, not so fit for conversion into deals. Swedish timber somewhat resembles that from the Prussian ports, but the balks are generally tapering in form, of small size, and not of good quality. Appearance: The wood is of a yellowish-white colour, soft, clean, and straight in grain, with small knots, and very little sap; but the balks are generally shaky at the heart, and therefore unfit for conversion into deals. Mr. Laslett says, 'There is little to recommend the Swedish fir to favourable notice beyond the fact of its being cheap and suitable for the coarser purposes in carpentry.'

A peal of bells has been placed in St. Alphonsus' tower, Limerick. Mr. Murphy was the founder.

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ILLUSTRATIONS.

NEW BOARD SCHOOLS AT WIDNES.—ANGLO-JAPANESE DINING-ROOM BUFFET.—ROUND AND GREEN'S BANK, COLCHESTER.—DETAILS NEW PREMISES OF ART UNION OF LONDON.

OUR LITHOGRAPHIC ILLUSTRATIONS.

WIDNES SCHOOL BOARD, SIXM'S CROSS SCHOOL.

This building, opened in November last, is one of a series erected for the School Board from designs by Messrs. F. and G. Holme, of Liverpool, architects to the board. The accommodation provided is for 800 children, and the buildings throughout are fitted with every modern requirement. The infant school, school of cookery, and keeper's house form a separate building in Milton-road. The fronts are of grey brick relieved by dressings, strings, arches, &c., of red Ruabon brick, and stone bands, copings, &c., are from Appleton quarries. The bell turret is roofed with oak shingles, the other roofs being of slate arranged in bands with Cooper's ridges, and lead finials. The interior woodwork is of pitch-pine stained and varnished. The heating is by hot-water pipes in the main building, and in the infant school by Shillito and Shorland's patent Manchester school grate. All the rooms are carefully ventilated. The cost has been about £9,000, and the work has been executed by Messrs. Carlile & Co., builders, of Widnes.

THE "BUILDING NEWS" DESIGNING CLUB—DINING-ROOM BUFFET.

CONTINUING our series of drawings by members of the BUILDING NEWS Designing Club, we have given to-day the two best designs for a dining-room buffet. The selected design is by "Motto J.," and "J'Espère" is the author of that placed second. Each design has notes upon it which will be found to describe the author's intentions in either case.

MESSRS. ROUND AND GREEN'S NEW BANK, COLCHESTER.

THE view of this bank, representing the front elevation on the High-street, has been designed in the Fifteenth-Century manner. Internally, it comprises on the first-floor the bank offices, including the partners' and manager's rooms, &c. In the basement a very complete arrangement of fire and burglar-proof chambers, book-room, &c., and on the other floors the manager's residence. The frontage is rather confined, being only 31ft. in length, the height to top of balustrading being 33ft. The front, as shown, will be built entirely in Westwood stone. In the carving will be represented Capital and Labour,

Avarice and Prodigality; in the minor portions the Hare and Tortoise, and other of Æsop's fables, relating more or less directly to the acquisition of wealth or the reverse. Over the manager's entrance the finial will personify Cerberus, while under in the lintel will be carved "Cave Canem," and a chained dog. In the centre panel of the oriel the arms of the erectors and their crest, while in the dormers the dates of the present erection and of the original establishment will be clearly shown. The architect is Mr. Ernest C. Lee, of Bedford-row.

CARVINGS, ART UNION OF LONDON, NEW PREMISES, 112, STRAND.

WE have already* published the general drawings and details of the new premises now in course of completion in the Strand for the Art Union for London. To-day we give some enlarged drawings of the carving to the panels of the pilasters on either side of the windows of the first floor, or principal stage of the Strand façade. By reference to the general elevation, or to the detail of this part of the front published in the BUILDING NEWS for March 14, the relative positions of the portions given to-day will at once be seen. Each pilaster is divided into three parts by two circular panels containing the portraits of well-known architects, artists, and sculptors. The drawings which accompany this description show the upper and the lower parts of the four panels, with the names of the eminent artists represented. The centre or intermediate panels will be given in an early number, as the proportions of our pages prevented the publication of the panels *in situ*. The work has been beautifully executed by Messrs. Mabey, of Princes-mews, Westminster; and Prof. E. M. Barry, R.A., is the architect of the building.

THE IPSWICH PUBLIC HALL AND CORN EXCHANGE COMPETITION.

THE *Suffolk Chronicle* describes the leading characteristics of the plans sent in for the alteration of the Public Hall, Ipswich, so as to render it suitable for use as a Corn Exchange. The competition, as we announced last week, was decided on the 2nd inst., when the Ipswich Town Council awarded the premium of 50 guineas to "Tria Juncta in Uno," who proved to be Mr. Horace Cheston, of Great Winchester-buildings, London. Competitors were asked to give an opinion as to the practicability of the suggestion, and each of the seven authors of designs declared that the alteration was feasible,—the only reply that could be expected from a competitor for the arrangement and supervision of the undertaking. The Public Hall, it may be remarked, was built about eight years since, and lies north and south, the chief entrance being at the north end, in Westgate-street. At this extremity there is a balcony, with gallery above, the orchestral stage being placed at the south end. The hall itself is 98 feet in length by 50 feet wide, and communicates at rear with a saloon and other rooms.

Mr. Horace Cheston's premiated plans propose to lengthen the present public hall to the southward (the rear), making it 150 feet in length, and securing an area of 7,650 feet super. This would necessitate the removal of the present saloon, also the acquirement of a triangular strip of land. At the back of the stage, at the south end of the enlarged hall, is provided a "crush" room, with cloak room, &c., and above it a saloon similar to that now existing. The lighting is provided for by filling in the present domes with flattened lights, and constructing a clear glass roof above. Balance lifts are shown for sinking the stands into the basement when not needed. The estimated cost is £3,400.

"Utility and Economy," by Mr. William Eade, of Ipswich, shows a second hall to south of present hall, divided from it by revolving shutters. This would give dimensions of 98 feet by 50 feet (the present building) besides a small hall 56 feet 6 inches by 52 feet, and a total area of 7,700 feet super. For the present platform a sliding one would be substituted, and the gallery would be removed, and a curved and glazed roof erected at the north end. The new small hall would be lighted by an arched roof of glass, supported on iron pillars. The estimated cost is £4,500.

In the plans of "Bona Fides" (Mr. Brightwen Binyon, Ipswich), a proposal is made to widen the present hall on the west side by 6ft. 6in. by piercing arches between the pilasters, and also on the east side if possible. It is also proposed to lengthen the hall so as to make it 63ft. by 137ft., and affording, after deductions for stage, &c., floor space of 7,303 sq. ft. For the present roof is substituted a glass curved roof springing from ornamental ribs, and also to enlarge the present side lights. At the back of the hall and stage is a corridor, 8ft. wide, and a saloon 30ft. wide by 48ft. is proposed to the west of this passage. The estimated cost is £5,250.

The authors of "Postulata" (Messrs. Wright and Wright, Ipswich), avoid the purchase of neighbouring property, and propose a small south hall, separated by revolving shutters, and a sinking stage, as in "Utility and Economy." The oval panels in the ceiling are to be filled in with glass, substituting a glass outer roof for the present slates. The corn exchange area afforded would be 7,833ft., and the estimated cost £4,000.

"Economy" (Mr. Henry Luff, Ipswich) proposes a hall 152ft. long by the present width, the special feature being the raising of floor 5ft., and heightening the present side-windows to a similar extent, carrying them up to the roof-plate, with an extra row of pilasters starting from the present cornice. This would avoid the difficulty as to the side-lights being high up, and in addition it is proposed to glaze the two centro bays of present ceiling, to place a glass roof above the ceiling, and to provide two large windows at the south end. The present balcony and gallery it is proposed to remove. The plan would give an area of 7,596ft., including stage, which could be utilised for market purposes by the provision of movable steps. A movable partition is suggested for reducing the hall to any required size. A saloon is proposed at the back of the stage, with retiring rooms over it. A cement floor for the hall is also proposed, and including the costs of this, "Economy's" estimate is £1,800.

"Excelsior" (Mr. Henry Elliott, Strand, London, W.C.) lengthens the hall to 140ft. by three bays. The gallery at the north end is reduced to small compass, but, as a compensation, light balconies are run for a short distance along the side of the hall from the south end. The present roof is extended over the added portion of the hall, but the upper part of roof is removed above the straining beams, and a lantern light running the entire length of the hall inserted. A saloon is proposed at the south end and above it a green-room, dressing-rooms, &c., on the same level as the stage. The estimated cost of this plan is from £5,500 to £6,000.

The remaining plan is that signed "Grosvenor" (by Messrs. Scott, Gibby and Barnard, Mark-lane, London). The lighting they propose to achieve by opening windows between the piers on each side of the hall, suggesting arrangement with adjoining owners, by glazing the centre portion of ceiling, and placing skylights on both sides. The front of the present gallery to be taken down. The present stage and orchestra to be removed, and a new stage erected, recessed into a crush-room at the back. At the back of the crush-room a supper-room is provided, seating 100 or 200 people. The area of the large hall is the same as at present, 98ft. by 50ft., the space by the present stage being all that is gained. The cost is estimated at £3,500.

South Petherton, Somersetshire, is about to be sewered in accordance with plans prepared by Mr. Martin, engineer to the Yeovil rural sanitary authority.

A statue of the late Chief Justice Whiteside, ultimately to be placed in St. Patrick's Cathedral, Dublin, is being modelled at the studio of Mr. A. Bruce Joy, in the Avenue, Fulham.

The second section of the Nottingham and District Tramways system, extending from the Market-place to Carrington and to the extremity of Forest-road, was opened for traffic on Saturday. The engineer of the line is Mr. MacNay, and the rails are Winty and Levick's patent. The stabling and offices have been constructed from the designs of Mr. Bromley, architect.

Mr. J. R. Hay, architect, was last week presented with a handsome clock as an acknowledgment of his services in connection with the erection of new Congregational Sunday schools at Castleford.

* BUILDING NEWS, February 23, March 7, and 14.

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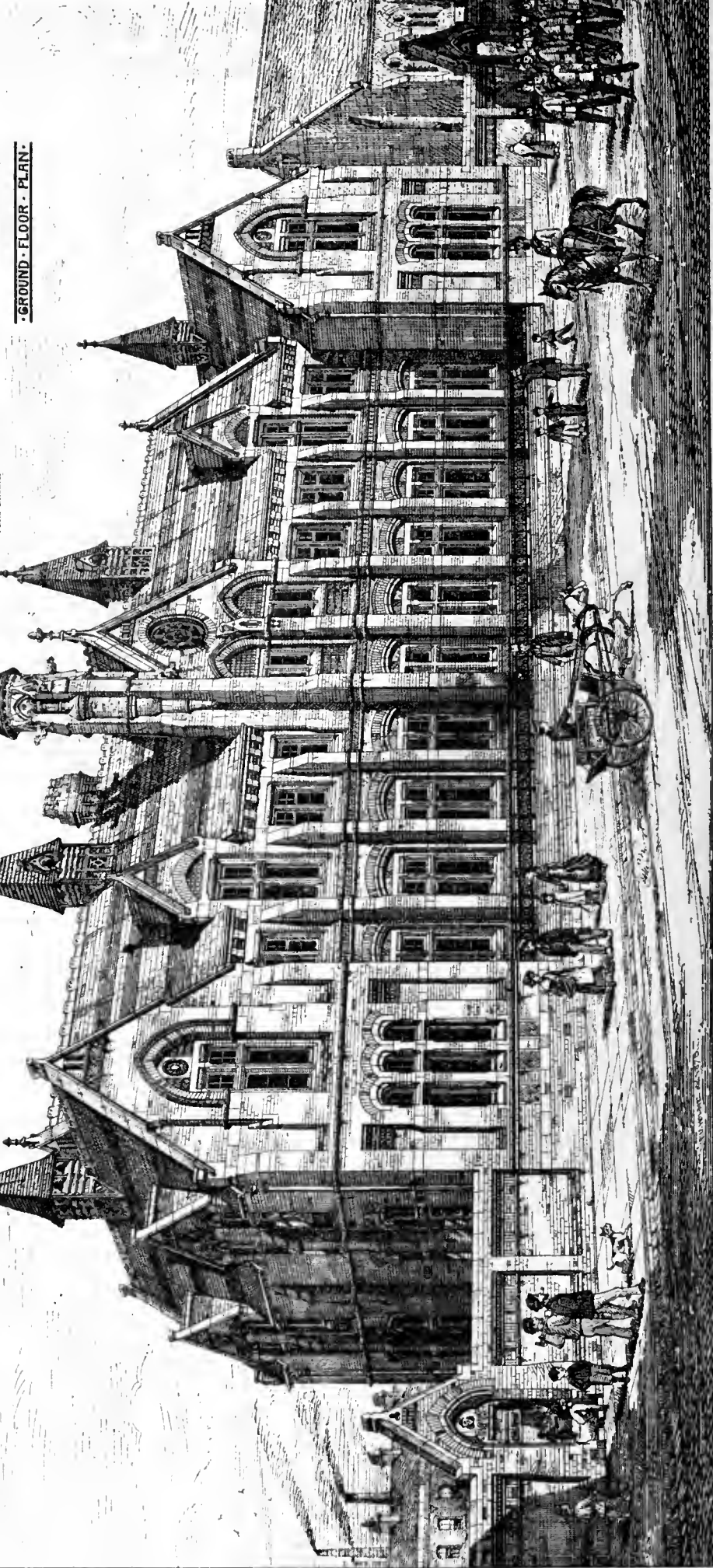
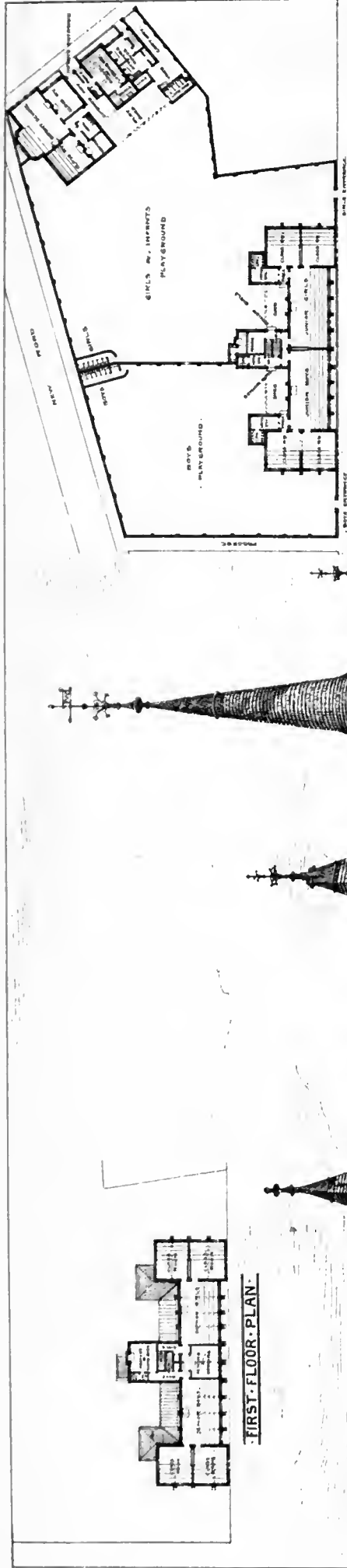
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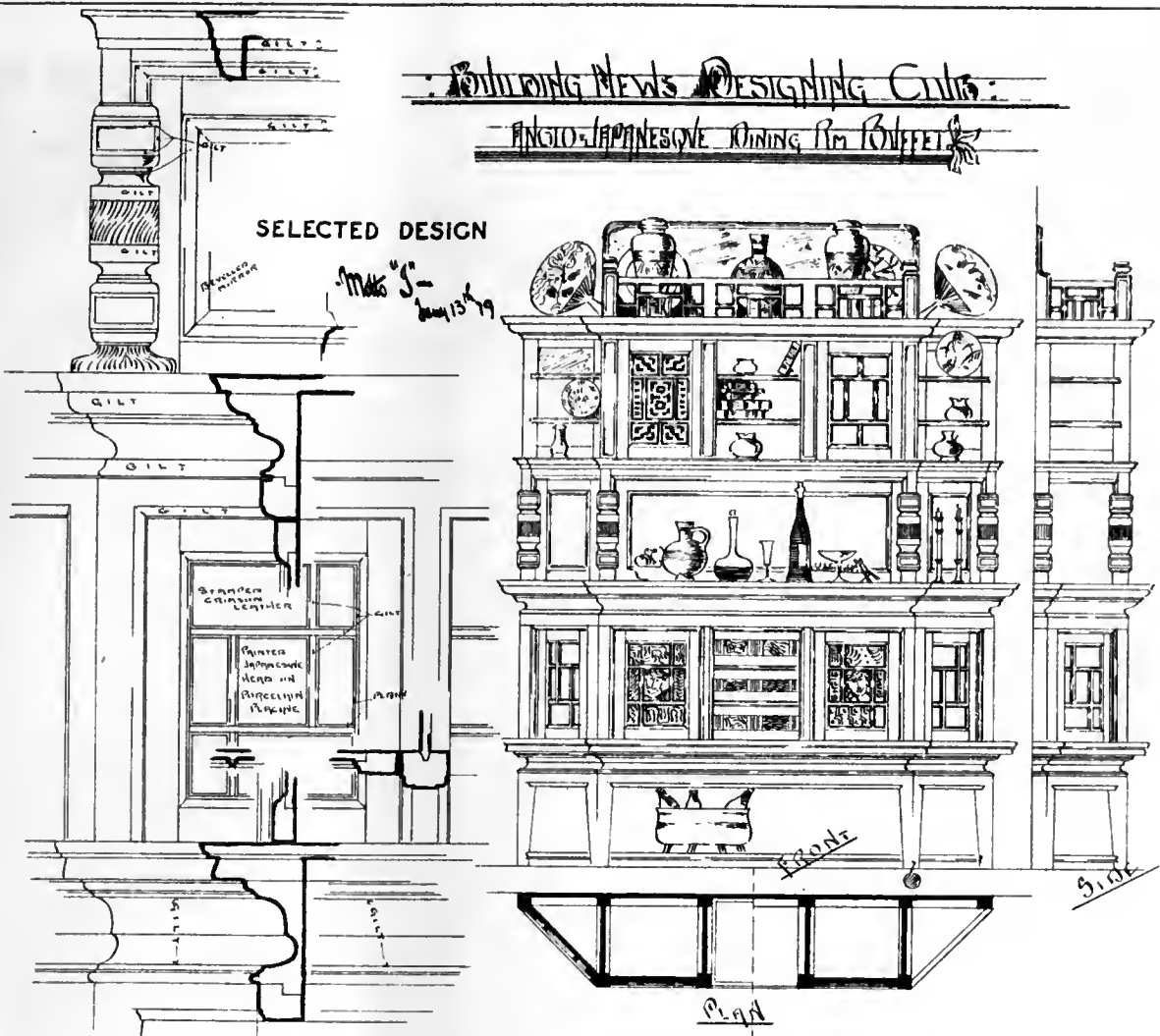
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Building News Designing Club.
ANGLO-JAPANESE DINING ROOM BUFFET

SELECTED DESIGN

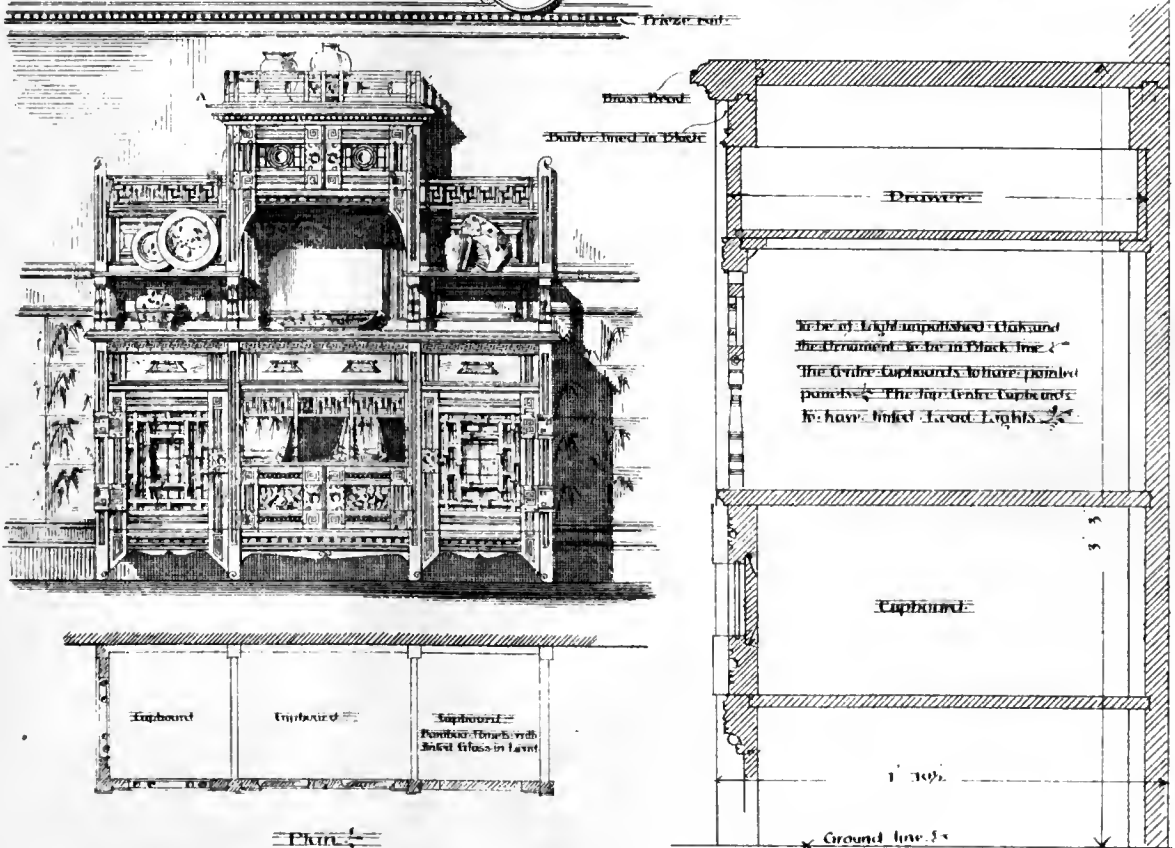


DESIGN PLACED SECOND

Building News Design Club.
A BUFFET 5'

JESPÉRE

Section first Centre.



THE SILICATE PAINT COMPANY'S NEW WORKS, CHARLTON.

SITUATED on the banks of the Thames, at Charlton, near Woolwich, the Silicate Paint Company have lately erected new works which promise to develop the resources of the company. On Monday last the works were visited by several gentlemen connected with the Press, and interested in the sanitary manufacture of paint, when Mr. Thomas Griffiths, the founder of the company, conducted the party over the new factory. The buildings, comprising blocks of substantial construction, occupy a site of about an acre in extent, and have been carried out from the designs of Mr. Ernest Turner, of Regent-street, at a cost of about £25,000. Our object here, however, is to confine the attention of our readers to the processes for the production of silicate paint, first manufactured in Liverpool, and which has gradually been growing in favour as a very desirable sanitary substitute for lead paint. White-lead is a material entirely repudiated at the Silicate Paint Company's Works, an oxy-sulphide of zinc taking its place. We may say at the onset that the silicate paint is a preparation in which silica extracted from a volcanic mineral forms the basis, its advantages being chiefly the absence of all chemical action between it and the material covered as that which ensues between iron and lead, and a petrifying surface, unpenetrable either by heat or gases. The process of grinding the pigments was the first operation inspected. In a long room are to be seen several mills and edge rollers and mixers at work grinding. Various pigments, such as ochres, and other colours combined with the patent white sulphide of zinc is passed through rollers, and kneaded into a paste of putty-like consistency. We see the same preparation combined with hard gums and mixed with oil or water. The colours are combined above with oil, and pass through shoots to mixing mills. The "petrifying liquid," as it is called, is a solution of silica, and is recommended as an effectual preparation for the protection of stone, brick, plaster, or woodwork. It has the property of hardening the surface of stucco and brick, and forms a washable distemper to walls. We understand it has been largely used in colouring the funnels of steamers, for which purpose lead paint is found quite unsuited. This liquid can be thinned with water or oil. We are told that three or four coats of this solution on brick renders it impervious to moisture, though it requires to be renewed every seven or eight years. Ascending to an upper story, the visitors inspected the mixers for dry materials, and trays heated by exhaust steam for drying the same. The preparation of "Griffiths' Patent White" forms another portion of the manufacture carried on. Beginning at the roof of the factory, we see large lead-lined tanks open to the air, into which sulphuric acid and muriatic acid are blown from an air-pump below through vulcanite pipes. The zinc is thus dissolved, and the solution is conveyed by pipes into purifying tanks below. A soluble sulphide boiled by steam in large iron vats is now combined with the zinc liquor which is conveyed to other tanks, and a precipitate is ultimately obtained which is pumped into filter presses. In these the material is pressed into cakes, which are afterwards calcined in furnaces to a white heat. It is re-pressed into cakes and placed in racks in a large drying-room made to hold 70 tons. The calcining furnaces, gum-rooms, and other appliances were afterwards examined, but the most interesting part of the inspection were the tests. First, the effect of heat on ordinary lead and "Griffiths' Patent White" was tried. Slips of iron painted with both were placed in a small furnace, and after exposure to an intense heat the lead paint entirely disappeared, while the zinc paint retained its body unimpaired. Another interesting experiment was next shown, which undoubtedly proves that as a sanitary paint the sulphide of zinc has advantages over lead in the composition of paint for certain uses. Two strips painted with the ordinary lead and the patent white were subjected to the fumes of sulphuretted hydrogen under a glass receiver. After a second or two the lead paint became quite brown, and ultimately black, while the other paint exhibited the same untarnished whiteness it possessed when placed under the glass. These tests were made in the company's

laboratory. Still larger ones were shown in the yard. A large board was painted with ordinary white-lead paint on one side, and on the other a like surface was covered with Griffiths' Patent White. A jet of sulphuretted hydrogen was made to play for a few seconds first on the lead paint and afterwards on the zinc paint. Directly the hose was directed to the former it began to get yellow and brown, and had all the appearance of being scorched by a flame. Turning the jet to the other end of the board no perceptible difference of colour was made, and the experiment, notwithstanding the intolerable odour of the gas, elicited much interest among those present.

Mr. Griffiths also showed the great covering power of this paint, in contrast with pure carbonate of lead, on four boards painted black, and of equal size, each measuring 16 square ft. Exact weights of pure carbonate of lead and of three different qualities of the "Patent White" were weighed out, and oil added. A decorator then applied them to the board with the following results:—

	Per cent. covering power.
The White Lead and Oil actually used weighing	9 oz.=100
Griffiths' Patent White, marked A, actually used weighing	5½ oz.=180
Griffiths' Patent White, marked B, actually used weighing	5 oz.=189
Griffiths' Patent White, marked C, actually used weighing	4½ oz.=236

The opacity of the lead was much inferior to any of the other three samples.

There are unquestioned merits in Griffiths' Patent White to which we may here call attention. It is a pure white of great body, which, as we have seen, does not tarnish or decompose like white-lead under the action of noxious gases; it stands great heat without blistering and discolouration, and is admirably adapted for iron structures, the walls of houses and hospitals. The silicate paint is well known to our readers. It dries quickly, with a hard surface; the porous face of the material it covers is case-hardened, and the experiments quoted above clearly show that its covering-power—a point that has been somewhat disputed—is nearly double that of common carbonate of lead paint of the ordinary quality. For resisting the action of salt water it is also recommended, so that for hydraulic and maritime purposes it has decided claims. We may add that it is sent out in the usual form, and when required for use is thinned with linseed oil and turpentine, silicate dryers being added. Every variety of colour and shade is kept in stock. The "petrifying liquid" has been largely used for covering damp walls, while the enamel paint, another beautiful preparation which retains a remarkable gloss, may be mentioned as a valuable decorative and impermeable surface for dados, walls of hospitals, and other purposes for which varnish is now employed. The "petrifying" liquid and enamel paints have, we believe, been used at the Grosvenor Gallery, and for newly-plastered walls, the solution of silica being a good preparation to facilitate the mural decoration. Large quantities have been used by the Indian and Home Governments, and the company have secured a contract for a twelvemonth's supply to the Imperial German Navy.

MR. SEYMOUR HADEN ON ETCHING.—III.

THE third and last of Mr. Seymour Haden's course of lectures on Etching was delivered at the Royal Institution on Saturday afternoon, the principal topic being the Printing of Etchings. In opening, the lecturer explained the characteristics of a dry-point line, and as compared with the etched and engraved lines described last week (see p. 369). The dry-point line might be described

FIG. 1



FIG. 2



as a ploughing of a copper surface by means of a sharp instrument which roughed the outlines

without removing any portion of the metal. If the style were held vertically the resultant impression as seen in section would resemble Fig. 1; the little horns turned up on either side caught and retained the printing-ink, so that the impression of a dry-point line on the paper from the upright style had a pyramid of ink corresponding with the groove, and on either side an indented dark shadow from the horns. In no case were the edges of a line quite true, owing to the minute roughnesses on the style. But practically the style was never held vertically—there was no need for the additional labour that would be occasioned thereby—but obliquely like a pencil. This raised a jagged ridge on the left side of the groove (see Fig. 2), and the impression from plate viewed in section was that of an irregular pyramid of ink from the incision and a deep shadow on one side indented by the ridge. The effect was that of a smear or stain rather than a definite stroke, and was totally distinct from that of an engraving or an etching. It was obvious that this roughened ridge would be rapidly worn down by handling, inking, and passing through the press, and hence a dry-point plate had no durability. Rembrandt was the father of the dry-point process. No one appeared to have regarded the method likely to be useful until the time of that artist, and even he did not utilise it till he was in the height of his career. Rembrandt's artist-life might be broadly divided into three periods of about ten years each. The first ten years were passed without any knowledge of dry-point; during the second decennial he mixed up dry-point with etching, plunging his outlines and biting them in with acid, and in that way obtained a greater amount of colour than had been done before. In the last period he never troubled himself to bite in a line, but his eye became so educated and his hand so firm that by sheer force he dug out every line on the plate. Some very fine examples of Rembrandt's work were exhibited on the screen, including the "Crucifixion"—a work in intense shadow with the exception of some vertical rays of light beaming on the central cross and dimly illuminating the mount—and the "Presentation to the People." These different works represented a gigantic labour in which great force of hand, determination of character, and complete knowledge of art were equally shown. At the present time no one in France practised dry-point. In this country some years since it was revived, but with no success; no one would buy a proof; the Etching Club did not approve of the process, and thus its use fell through. The only artist who practised it was Whistler, who, like Rembrandt, had taken it up in his later years, and some fine dry-point work had been done. But Whistler's works were entirely and uniformly fragmentary, and never carried out to completion. In order to afford a better notion of the conditions and physical properties of the engraved, etched, and dry-point line, he had prepared the following tabular summary:—

MATERIALS AND ARTISTIC PROPERTIES OF ENGRAVED, ETCHED, AND DRY-POINT LINES.

1. Engraved line: as to Form depends on the instrument that produces it—i.e., V-shaped. Capacity for containing ink, exemplified by cast it gives—moderate. Colour depends on shape and volume of cast and on shadow projected by cast—grey. Durability depends on form and extent of metallic surface left to resist forces employed to act upon it (which are, inking of plate, friction of printer, action of press)—great. Sum of artistic qualities—greyness, constraint. Sum of physical properties—great durability.
2. Etched line: as to Form, determined by action and strength of mordant—an irregular sphere. Capacity for retaining ink exemplified by cast it gives—great. Colour, depending on form and volume of cast—considerable. Durability, depending on form, and amount of metal left to resist wear—small. Sum of artistic qualities—colour, accent, freedom. Physical properties—low degree of durability.
3. Dry-point line: as to Form, depending on action of style and direction of impact—flat and extended. Capacity for holding ink depending on force employed, burr raised and depth of sulcus made—great only at first. Colour, depending on cast of sulcus and extent of surface disturbed by style—rich at first, but soon becoming grey. Durability, depending on power of resistance to pressure and friction—extremely small. Sum of artistic qualities—richness of colour suggesting velvet pile, absence of freedom. Physical properties—Durability, Nil.

Recurring to the etching process, the lecturer referred to the delicacy of the etched plate, remarking that there was a distinct difference perceptible to the artist between the first and a second impression. For continuous etching on a zinc plate he used, as he mentioned last week, 2 parts of chlorate of potash to 10 of hydrochloric acid, diluting with 88 parts of water. This was an extremely weak solution; a better proportion would be 2 of chlorate of potash to 6

of hydrochloric acid, but it would cause a great ebullition, which would interfere with the view of the etcher as he worked. It so soon became saturated and exhausted itself that the mordant had to be changed about once in a quarter of an hour, but as the solution was extremely inexpensive, there was no inducement to use it too long. It should be recollected that it was neither the hydrochloric acid nor the chloride of potash which bit the zinc plate, but the chemical interchange and reaction, steps which were simultaneous. Some ebullition of gas necessarily took place during the reaction; if none were observable the artist knew the plate was not being bitten. It was evident, therefore, that the greater the ebullition the more rapidly was the etching being bitten in, and that was why he had used a strong solution when etching a plate during the previous Saturday's lecture.

Mr. Haden then proceeded to his main subject, the printing of etchings. This was more or less of an artistic character, and had always been retained in the hands of the artist. In an old etching, by Abraham Boss, on the screen representing the printing process, it was clear that the actual printer was the artist, superintending the work of an assistant. He knew of but two printers of etchings in this country at the present day, of whom Mr. Golding (who has acted during the lectures as Mr. Haden's assistant) was by far the best he had ever met with. Mr. Brooks, a nephew of the steel-plate printer, had been spoken of as a very good printer, but of his work he had no personal knowledge. As a rule, a steel-plate printer could not be trusted with an etching; he was accustomed to handle a plate roughly, to scour it with coarse muslin, and to print heavily. As an illustration of this he might mention that some time since some excellent plates by Whistler were intrusted to a steel-plate printer. The lecturer was at the pains to visit the printer's and explain the way in which they should be treated. The man professed to understand all about them, and, as the plates were in the best possible condition, satisfactory impressions were expected. The results were so bad that, supposing the plates had been worn out by handling, &c., they were sold for a mere nothing, but the purchaser found on examination that they were still capable of use. For proofs, the paper ordinarily used was common plate paper; but it was too coarse, was scored with lines, and often contained iron and plaster of Paris, which were detrimental to the plate. The finest material for printing upon was old *vergier* paper. Some specimens of this, of the kind actually used by Rembrandt, were exhibited, Mr. Haden remarking that he had picked them up sheet by sheet, quire by quire, and sometimes a ream at a time, in Holland, Belgium, and Spain. Sheets of the old French paper, used by Turner in his "*Liber Studiorum*," were also exhibited, and were described as a very good material. Rembrandt also used a very fine paper, known as Japanese. The modern paper from Japan gave a good impression, but was dry in colour, and was not very desirable, for it became cottonous with wear. It was, indeed, the fibre of a plant, and was produced by first pounding the stems with stones till they became rotten; this was reduced with water to a pulp, and spread upon stones to become the thin paper exhibited. A very good *vergier* paper was made by Watson, but its thinness was a disadvantage; he intended to order some of thicker texture to be made, and it would then be the best for the purpose. The ink used was of lampblack, tempered with sienna, umber, and sepia; the latter might be used by itself, but it was very costly. Two kinds of oil were used—strong and weak. If an etching plate appeared weak, a strong oil was used by the printer in his ink to bring it out; and if it looked strong, he employed a weak oil. The character and composition of his ink was to the printer of etchings as important a part of his art as the biting-in was to the etcher himself. Judgment was required not only in proportioning the ingredients, but in spreading just the right amount on the plate to secure a good and uniform impression. The press used was a small wooden one, with four long levers attached to the wheel, scarcely changed or improved from the one depicted on the etching by Boss previously referred to, and which was executed about A.D. 1600. A larger press than that shown (taking a sheet a little larger than a *BUILDING NEWS* page) was necessary for etchings of any considerable size, but the principles of construction were equally

simple. The table on which the plate rested was, like the framework, of wood, but he should prefer an iron bed, believing as he did that quite sufficient elasticity of pressure was secured in the blanket and wooden roller. The blankets upon the roller should be old, and required changing at every eight impressions, or the moisture they imbibed from the paper would spoil it. The proof which was the end of all this preparation was protected by a backing of stronger paper, and it should be dried by hanging across a pole or string; the best old etchings showed on the back the mark of this line. If the proofs were laid one upon the other the delicate rounded casts and pyramids of ink were flattened, and the impressions lost shadow and were blurred. When dried singly, as in the early days, the lines would actually stand out in relief upon the paper. As these suggestions were entirely new, he ought to state how he arrived at the conclusion embodied in them. He had made sections of the various kinds of lines, and had also taken casts from plates, and examined them by the aid of magnifying powers. He did not like the term "proof" on account of the mode in which it had been used, but for purposes of illustration he would, in deference to usage, divide the impressions taken from a plate into proofs and prints. There were two sorts of proofs: one was the trial impression taken from time to time by the artist, in order to ascertain the condition of the plate. Such proofs in the case of an engraving might amount to five or even ten in number, but could never reach 5,000. For etching but three or four were at the utmost required. In speaking of the enormous numbers of so-called "proofs" taken and sold under the stamp of the *Printsellers' Association*, he had had no fear of being guilty of exaggeration, but he had taken pains to ascertain what were the actual issues. Of one of these plates £45,000 worth of impressions were taken and sold as "proofs," of another from £30,000 to £40,000 worth were sold, in every case as "proofs," and in the first case, notwithstanding that £45,000 worth of proofs had been sold, the plate was examined and taken down to the press again, when several thousand pounds' worth more "proofs" were issued before the plate was considered good enough only for "prints." The first fifty or hundred proofs taken by engravers might, however, be properly considered to be of higher value than subsequent ones, all of which should be deemed simply prints. Of etchings, on the other hand, but very few could be printed, and the price of these, if etched by an artist, would increase year by year, while the engravings already referred to would never return the purchasers' shillings, or even pence, for their outlay. Mr. Golding would now print off from an etched plate by the lecturer; he would examine it, add a few touches to the plate where needed, and return it to Mr. Golding, who would print a second impression. At the third impression he should tell him that it would do, with the number of impressions that he thought the plate was capable of producing, say, twenty-five proofs, and should mark the plate with his *bon à tirer*; should it bear more than that, all subsequent impressions would be merely "prints." The etcher utterly repudiated the mark of the *Printsellers' Association*. For himself, he wrote on the trial specimens, "Artist's proof, No. 1," "Artist's proof, No. 2," and "Artist's proof, No. 3," as the case might be, and then 1, 2, 3, up to the number to which he had put his *bon à tirer*. Thus, the number written by the etcher represented the actual number of the impression in the series, and this etchers considered a better guarantee than the *Association* stamp. One of the absurd regulations of the *Printsellers' Association* was, that the artist was required to state beforehand how many impressions of the plate he intended to issue. This, in the case of an etching, was practically impossible, for all depended on the character of the plate. If it were a soft one, the number of good impressions might not exceed eight or ten; but if it happened to be hard, it might reach a hundred. In the case of a dry-point, the durability of a plate was still more uncertain. What, it might be asked, was a "state" as applied to an etching? After a few impressions had been taken from a plate, some corrections might be made by the artist, and the printing was arrested for this purpose. Those printed prior to this alteration were therefore known as the first state of the plate. Some artists added a few scratches to the plate at each working of the press, and thus multiplied states, to the confusion of the cata-

loguer. A recent catalogue of Rembrandt's works had for the last two years been busy in enumerating such states, and, moreover, being of a busy and inquiring turn of mind, had copied all the lecturer's original observations and incorporated them into it. At this stage of the lecture Mr. Golding printed a trial proof from one of the zinc plates etched by Mr. Haden in the room on the preceding Saturday. Mr. Haden added a few lines and touches, and a second artist's proof was pulled off. Mr. Haden continued—If I now write my *bon à tirer* upon the plate, the number indicated will be well and honestly printed. In England printers never steal proofs, but in France they never neglect the opportunity of doing so. A friend of mine was in an auction room in Paris some time since, when one of my miserable etchings came up for sale. My friend knew that no more than twelve impressions were supposed to have been struck off, and he also knew what had become of them, and that this could not be one. He therefore gave twelve guineas for it at the auction, and when he had bought it he examined it in the room, and deliberately tore it in halves, and said to the astonished company, "I have received no orders for this, but I have reason to know this to be a spurious impression, and am perfectly sure that Mr. Seymour Haden will repay me the money." The people at the auction were still very much amazed, but my friend's conduct left a very good effect. The process known as "*acierage*" consists in covering, by means of galvanic action, the soft copper plate by a hard coating of steel, for the purpose of enabling the printer to take off a great number of impressions. This seemed likely to give a new power to the etcher; but a grave practical difficulty to the process is that the ink quits the plate too easily. The result is a dry and miserable impression, so that the etcher does not care for it. There is, indeed, no reason for the adoption of any such process of multiplication of copies. Certainly, the etcher has no object in publishing many impressions, and at the present time there is no such demand. If there are fifty in the whole country who care for an etching, there certainly are not fifty-one. However, *acierage* is extremely useful for coating the plate before being handled, for many plates are literally worn out before a good impression has been taken, and the steel face can be washed off by acid before the plate is printed from in the ordinary way. Such a regulation as that of the *Printsellers' Association*, which requires the number of impressions to be declared, would have been fatal to the occasional finding of etchings by the old masters, had it been in force in their day. In that case I should never have been able to secure the beautiful little etching by Rembrandt (shown on the screen) which turned up the other day, and which cost me at auction £74. The limitation caused by this *Association* has the effect of transferring property in an etching or engraving from the artist into the hands of the trade. Let us suppose that an artist published a work illustrated by, say, five-and-twenty etchings, and that 150 copies of that work are printed, and these are speedily sold at the published price—suppose we call it 12 guineas. In less than ten years the value of that work has risen to 25 guineas, and it has passed altogether out of the hands of the artist into those of the trade, who destroy the letter-press and sell the etchings in detail for 63 guineas, and in a very short time there won't be a copy of the book I refer to left. Some time since I executed an etching and gave it to one of the largest printsellers to publish. After a very short time I found that its sale mysteriously stopped, and this continued for more than a year. The publisher had, I presume, received a threatening notice from the *Association* that if he continued to sell it he would be expelled, and a note was sent throughout the kingdom. In a very short time the impressions must pass into the hands of the trade, and the artist will never derive any advantage from his etching. We have now brought our little course of lectures to a close. We have endeavoured to look at the subject theoretically and practically. We have entered into all details, have shown the advantages of etching, and its history, and have endeavoured to point out fearlessly the obstacles which hinder its revival. Art has for some years past been raised to a false level. The prices demanded by artists have been out of all proportion to the earnings of other professional men. When we hear of £2,000 being given for a por-

trait we ask why should not the doctor have £4,000 for curing a fever, £10,000 for a case of pleurisy, and £60,000 for saving life? What art can flourish at such a rate as that? If all this is so wrong, time is it that, by some unmistakable manifestation, it should be shown. Such manifestations of public opinion are being shown. It is becoming apparent that the high pressure of the last fifteen years cannot be kept up, and that the public are getting tired of "Stags at Bay," "Squirrels Cracking Nuts," and lackadaisical young ladies. I trust that this is the beginning of a change for the better in public opinion.

ART AND FREEDOM.

MR. AUBERON HERBERT, who presided at the annual meeting of the Southampton School of Art, in the course of his address remarked that it seemed as if it was impossible for a nation in a condition of servitude to have a keen perception and enjoyment of what was beautiful, or to have the power of expressing it. What, he asked, was the great moment of Greek art? It exactly corresponded to the moment of highest national greatness. The moment in which those beautiful sculptures were made in Athens, and the city was made glorious by her buildings, was the moment also of her great generals, poets, and statesmen; it was the moment of her richest and fullest national life, when the nation had just successfully fought to be free, and was exulting in her hard-won freedom. It was so also in the history of Rome, although there, as it happened, the moment of successful art was not exactly contemporaneous with that of national greatness, but followed close upon it. Nor is this unnatural. The seed had been sown, though the fruit was delayed in ripening. Passing on to a great period in the history of Europe, too, after that long sleep which they spoke of generally as the Dark Ages, when at last the country seemed to awake, and light broke in upon minds which had slumbered so long, it was soon after the year 1000 that there came to us that great and rich development of artistic power, which re-created the existence of architecture. Some 400 or 500 years afterwards, when this great wave which had touched the mind of Europe seemed to have nearly worn out, in the period known as the Renaissance, there was another wonderful outburst of poetry, literature, and art—in architecture, sculpture, and painting. Where, at that time, did they find the homes of this power? In the free cities of Italy. There were certain cities in Italy which beyond all others had preserved their individuality, life, and freedom, each like a separate thread running through the history of Europe. They would find that it was to Florence and Venice, they owed the greatest debt. Now what was the lesson which he wished them to draw from this? It was, first of all, that all who cared for art, who would enjoy the pleasure which it could afford, and who desired to see the art of this country carried higher and higher, must remember that art never can live and flourish unless it grows in a free soil, unless the awakened intelligence of a people is surrounding it and supplying it with nourishment. They must require of politicians, of those who governed them, and of all those who had charge of the fortunes of this nation, that they should watch very carefully over English liberties, so that there may ever be the right soil in which this tender and delicate plant of theirs was to grow. And he thought it not only depended—important as that was—upon what they called national freedom. "I now come," continued the speaker, "to another kind of freedom, which no statesman or public man can give you, but which each of you must win for him or herself. I mean the freedom of the inner life, that freedom of the mind which makes a man independent of the world outside him, of its caprices, its fashions, its tyrannies, which lets him see with his own eyes and judge with his own judgment. It is an old cry, that the world is too much with us; that it forces us to be of itself; that it hinders the growth of our own nature, and the fashioning of our own instincts. I say, then, let us strive to be free in ourselves—let us strive not to be caught in the current that is round us, and carried we know not whither; but let us strive to keep unimpaired our allegiance to that tribunal which is within ourselves. Let it be our own perception, our own reason, our own judgment, our own con-

science, not those of the world. What is it which makes one man a really great painter where the many fail around him? It is that they are looking with the eyes of the world; he is looking with his own eyes, and seeing what they fail to see. You remember what Turner said—Each man saw according to the power of sight that he brought with him. And that power of sight such as he had, and such as other great men have had, comes simply from the fact of the freshness and keenness and truth of their perceptions—perceptions belonging to the individual and differing altogether from those of the crowd around them. When, on the other hand, Ruskin spoke of the Academy as in great measure like a gigantic edition of the *Illustrated London News* he meant that a large number of the artists were thinking the world's thoughts, were looking with the world's eyes—not using their own eyes and their own thoughts, and therefore, in the expression of these thoughts became trivial and poor. I know that it can be the lot of but few to stand out far above the rest of their fellows, to mould public opinion, or found a new school of art, but it seems to me possible for each one of those to whom I am speaking to be true to their own self—not to bow down to the world that is round them, to build up their own standard of the true and the false, to cherish and cling to the freedom of the inner self, and in doing so to raise here and everywhere the spirit in which we look on art in this country, to make our perception more individual, and therefore more truthful, more fresh, more vigorous."

CONTEMPORANEOUS ART.

A LECTURE entitled, "Contemporaneous Art, as Illustrated by the Great Paris Exhibition of 1878," was delivered by Mr. J. Forbes Robertson before the members of the Society for the Fine Arts in the large gallery, at 9, Conduit-street, Regent-street, W., on the evening of Thursday last week. Mr. James Edmeston, F.R.I.B.A., presided.

Mr. Robertson said, that whatever the motives of the originators of the Exhibition in Paris, about which various theories had been put forward, the issues were momentous in the extreme, both in an intellectual and artistic aspect. The wonders of the world had been gathered together for universal admiration, promising that the sword would sooner or later be transformed into a ploughshare. To deal with a moiety of them only in a brief hour would be nothing less than presumption. We are first struck with the art aptitude of the French people in statues and their accompaniments. We could not have produced such an effect. Passing through the great hall, the first set of rooms was devoted to the British schools; and these, by universal consent, were creditable to ourselves. British characteristics may be summed up in the word modesty. The French excel in handling—the facile use of the pencil comes to them by nature. America and Italy follow the British art section. America does not show in sculpture so successfully as it might have done, Boston submitting nothing. French influence is strongly marked in all American exhibits. Wiley has a good picture, but it is strongly French. Dana is a remarkable sea-painter. Thirty years ago America could scarcely exhibit anything; now it occupies a foremost place. Italy, once a painting country, is now one of sculpture. It still, however, has artists with serious aims. The Spanish influence is, however, felt throughout Italian work. The French school is also seen in Italian work. Italy's work in sculpture is varied; its level, however, is not maintained throughout. The figure of the late Pope is excellent. With political liberty vigour has been imparted to Italian art. Austria has some grand pictures, as the entry of Charles II. into Antwerp. Portraiture is also well represented. Hungary only fills one salon, and its work is quite up to the Austrian standard—rich in texture and colour. One picture, a Miltonic subject, received the highest prize that could be awarded at the Exhibition; strength of representation and beauty of effect. Hungarian art is excellent, but not special. Sweden and Norway are devoted to sea subjects and landscapes. Their technical qualities are of a high order. There is French influence, however, as in manners and customs. Charles XII. of Sweden's funeral is Swedish, and impressive and characteristic and national. The Norwegians have no historic work of importance, although in general effect

they cannot be said to be inferior to the Swedes. Denmark has little on the walls. The manner is tender and sympathetic, but on the whole weak. Portugal does little more than rise to the level of a provincial English town. Greece shows work in a smooth, conscientious way; but there is nothing of classic Greece. Switzerland has some good pictures, but nothing calling for special attention. It is also rich in art productions, but often there is a touch of German dryness. Russia is a small state in art, however large in area. Its students only who have studied in Paris come to the front with credit to themselves and honour to their country. The activity of the Russian artist is remarkable. Germany and Belgium are vigorous sometimes to coarseness; amounting sometimes to unflinching realism. Holland does not have many pictures, but its sea pictures are perfect. What, again, is to be said of France, that has grouped these treasures? Paris is the art school of the world; embracing all schools, and towards which pilgrims flock from every land. Its roll of illustrious names is worthy of the admiration of the world.

THE HISTORICAL DEVELOPMENT OF PATTERN DESIGNING.

MR. WILLIAM MORRIS delivered a lecture on this subject at the Co-operative Institute, Oxford-street, on Tuesday evening, Mr. G. C. Warr in the chair. The progress and development of ornament were traced from its earliest records on Egyptian tombs and temples, its symbolic character being demonstrated. In the remains of Assyria this was still more developed; the sacred tree and serpent, the embodiments of the spirits of good and evil, were constantly repeated in more or less conventionalised form, and these emblems survived in ornaments of every style to the latest Gothic and Renaissance. The love of delineations of life and of flowers was universal. The progress of art in Persia was also adverted to, and the winged bulls and lions were referred to as derived from more ancient Assyrian and Babylonian sources. The incised and intricate patterns of Persia, India, and other eastern lands were shown to have a common growth. Greek art exhibited a steady growth of refinement and grace to the Periclean age, but there was throughout a coldness and constraint, and a painful sense of unattained perfection. Ornament was everywhere subordinated to architectural form, and was of simple character, and derived from Eastern sources. The common error that the Greeks had little perception of the beauty of colour, and that they were even colour-blind, was exposed and contradicted, the lecturer urging that Greek colour-nomenclature and habits of thought referred rather to the tone and brilliancy than to precise hue. As the Greeks decayed the Romans increased in power and influence, and to them, or rather, perhaps, to the vast assemblage of nations brought into intercourse under their imperial rule, the world owed it that architecture became an art to be studied, and not a conventional form of building. The arch was introduced as a building feature of practical use by the Romans, and fresh combinations of parts, constructional innovations, and decorative experiments were tried with the daring of engineers rather than with the skill of architects. With the change of the seat of government to Byzantium a further development of art took place, the influence was being felt to the present day. The exuberant richness and wealth of ornament then employed in Constantinople had furnished suggestions to the whole world. Incidentally, the Mosque of St. Sophia, in that city, was referred to as the most beautiful building in existence, and the delicacy and refinement of its ornamentation was illustrated by a large coloured diagram of one of the capitals, the bell of which was completely mantled by crisp fern-like leaves, spreading from the astragal. Arab art was really a combination of Greek, Coptic, and Byzantine, but owed its chief impulse to the last source. The gradual spread of Byzantine ornamentation and architectural style over Europe formed the concluding part of the lecture. These Eastern ideas overran Italy, spreading into Lombardy, where they were adapted with a new force and beauty, and the builders, who had been rugged and coarse, displayed work of a lovely and delicate character. From thence the new ideas penetrated into France, and so passed into Germany, where the ornamentation was so much admired that on the

banks of the Rhine the mode, now known as the Romanesque style, had never been abandoned. From the Rhine it was transported to England, and was developed on new lines, till the Italian phase, introduced by the Normans, supplanted and partially absorbed it, and Italian phases, later on, again banished the Gothic modes of thought. The tide still swept westwards and northwards, far-off Iceland being at length reached. Mr. Morris urged that no art was worthy of the name which was not at once a pleasure to the artist to produce and to the user to behold.

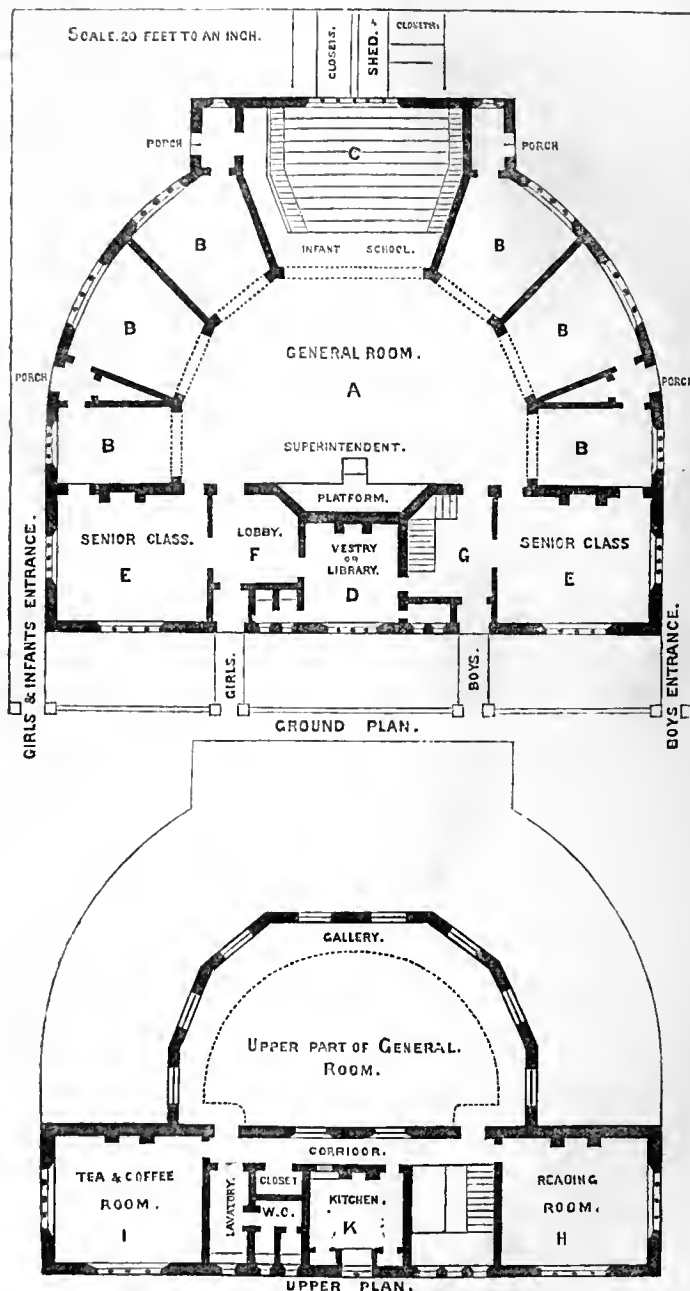
SUNDAY-SCHOOL BUILDINGS.

A SERIES of articles on the above subject has recently appeared in the *Church Sunday School Magazine*, written by Mr. C. G. Maylard, A.R.I.B.A., which offer some suggestions for the consideration of builders of Sunday-schools. It will at once be admitted that the present buildings which answer this purpose in our towns are deplorably defective in planning, uncomfortable, and in most cases quite inadequate for the purposes of Sunday-school teaching. In the majority of instances, they are hired rooms in unhealthy localities, low, ill-lighted, and unventilated. Mr. Maylard, who has given, we believe, much attention to the wants of Sunday-school building, points out the value of separate class-rooms for the use of scholars whom it is desired to attach to the Church. He says justly, "in every case, whether a large or small school, there ought to be one general room with the necessary class-rooms in number according to the size of the parish. It is of paramount importance that these adjuncts to the school should be as numerous as possible, consistently with the extent of the population, and the smallest school should not have less than two." It is doubtless, as the author points out, the policy of the clergy to provide separate rooms to prevent the elder members leaving at a time when they ought to become attached to the Church. Advanced scholars do not care to mix with younger children, but if other rooms were provided they could meet as Bible-classes. These rooms would also be available for other uses, such as instruction for confirmation, servants' classes, reading, &c. If, further, these separate rooms could be made capable of being thrown into one general room, an additional advantage would be insured, as such a large room could be turned to various purposes for parochial meetings or entertainments. The author shows first how a school for a small parish may be planned. He proposes a general schoolroom 40ft. by 30ft., with two class-rooms at one end, each 18ft. by 14 ft., opening into the general room by folding or sliding doors. Each class-room to have its own entrance. At the other end of school-room is shown the main porch entrance at one corner, a recess for superintendent's desk in middle, and a small class-room with separate entrance at the other corner. Such a general schoolroom will accommodate at the usual allowance of 8ft. superficial to each scholar, 200 children, and the class-rooms 20 for Bible-classes or 40 infants as a gallery. The room could easily be improvised into a church or used for mission services by making the recess a chancel, and the small class-room at side a vestry, and by removing the doors of the two class-rooms at the other end; in this way 300 people might be seated. It is pointed out that the room may be divided by curtains. Another plan on a similar principle, but with separate rooms for the boys and girls is given. The arrangement is that of an inverted T, the vertical part being the boys', and the horizontal part the girls' school. At the end of boys' school two class-rooms are shown 14ft. by 14ft. each, opening into it and with separate entrances, also two other class-rooms each, 22ft. by 14ft. in the angles of large rooms, available for either school. The large schoolrooms are 40ft. by 30ft. for the boys, and 56ft. by 30ft. for the girls; the two being capable of being thrown into one by the removal of a partition. The class-room are also arranged to be thrown together for mission services, &c. The school is capable of accommodating from 500 to 600.

Mr. Maylard next proceeds to show the advantages of the "radiating" or American system—a plan which has partially at least been introduced into this country. A combination of the rectangular and radiating principles is shown by a plan of a school at Wandsworth, by Mr. J. Weir, architect, designed for the Wesleyan

Sunday-school Union. The school-room is 51ft. by 34ft.; at one end are 4 class-rooms arranged round a segment—in plan the arrangement looks like an arch with 4 vousoirs, segmental in its inner curve, and with straight extrados. At the other end is a shallow recess and platform, which might be used as a chancel. But the author advocates a more thorough carrying out of the radiating plan, and furnishes two plans to illustrate his remarks. One of these represents a simple semicircular building, the central space being the general school, 30ft. radius from the superintendent's desk, which forms the centre of chord line or diameter, a platform recess being behind. Six class-rooms, each 22ft. by 18ft. are arranged round the outer line of this semicircular

rooms at the sides, and an infants' class-room with separate entrances. We quote the author's description: "On the ground-floor is a central room A, 40ft. by 20ft. for 150 scholars; 6 radiating class-rooms B, for 156 scholars, and an infants' class-room C, for 85 scholars, all with separate accesses, and all available for use as one large room to seat 500 people. The position of the desk of the superintendent is such that from it he can see every scholar in all these rooms, and the same would be the case when used for Church services. A large arched recess is at the back of his desk with a platform for speakers on occasions of parochial meetings. A vestry or library, D, is arranged at the back of the platform, with lavatory, water-closet, and book cupboard.



space with radiating division walls, and separate entrances and wide openings with folding doors towards the schoolroom so that every scholar can see the superintendent, while each class-room is equidistantly placed from the desk. Such a school would seat 180 children in eighteen classes, while, with the class-rooms, it would accommodate nearly 600. A front or straight range of building contains two Bible class-rooms for adults, committee-rooms, stairs, and lavatories. It is easy to see that this plan is well adapted for a large parish, lends itself admirably to parochial or other meetings by removing the folding doors and erecting galleries over some of the class-rooms—an arrangement that would enable 1,000 people to be seated. We are indebted to the author for the use of the accompanying plan which explains this arrangement more fully. As will be seen, it contains a general room with radiating class-

Right and left of this room are entrances for senior boys and girls respectively, with a class-room E, for each to hold 36. The total number of scholars thus provided for is 463." F, is a large waiting lobby for use of those who get books, while C is a lobby and stairs leading to a reading-room, tea and coffee-room, and kitchen, in connection in centre. A gallery round the general room could be readily constructed, available for parents on prize distributions, and it is also pointed out that the two senior class-rooms are sufficiently high to obtain a mezzanine story for caretaker's rooms over lobby and vestry. The general room would be lighted by a series of windows above the openings of class-rooms, the latter being kept low. From this plan it is clear the space is occupied in an economical manner, and that the system adapts itself to square sites. On the rectangular plan of building, a large part

of such a site becomes necessarily occupied by projecting class-rooms, and the land is more cut up. Referring to cost, the author bases his calculations upon the London market, and allows 6d. per foot cube. The small rectangular plan we first described would at this rate cost £1,150, or a little over £4 a child; the larger plan for 550 scholars would cost about £2,350, and the large radiating school for 700 scholars would cost about £3,000; the one we illustrate about £2,500, these sums including external conveniences and boundary walls, but no fittings. Various details and sanitary hints are given by the author in his concluding paper, to which it is here hardly necessary to refer. The selection of a sunny aspect for the windows is of course desirable; heating is best effected by hot-water or air, with open fireplaces in the class-rooms if necessary. Air-chambered grates, drawing their air-supply from the outside are recommended, the heated air escaping through a grating at the top, capable of being regulated. As regards the ventilation, separate ventilating flues in connection with the smoke-flues are advocated, openings for the exit of vitiated air being made near the ceiling, having a Sherringham, Boyle or Arnott's valve. Draught is maintained by gas-jets placed just above the valves in the flues, and lighted by an opening with close glazed door. Sun burners with shafts are also recommended for flat coiled schools. The fresh air is proposed to be introduced behind a wood dado, having a space of about 2in., with movable hinged flaps for the admission of air. With regard to the class-room doors, the author prefers those which slide up from the floor into the wall, hung at the sides like sashes, to folding doors; in this case the general school would have to be top-lighted or arranged as a domical lantern. Mr. Maylard's suggestions are sensible, while the system of arrangement he advocates is strictly scientific.

MR. ALMA TADEMA'S PICTURES.

THE pictures painted by Mr. Alma Tadema for this year's Academy Exhibition were on view at Messrs. Pilgeram and Lefevre's galleries in King-street, St. James's-square, during the latter end of last week. We scarcely need to tell our readers that they well sustain their author's reputation; and as examples of consummate *finesse*, combined with a power of realistic effect, we have seldom seen finer works, even by this master. "Down to the River," the largest picture, is a grand piece of painting that has more historic interest and suggestiveness in it than the simple title would lead us to expect. It represents one of these noble stone bridges that might have spanned the Tiber or some classic river in its palmiest days. An Italian lady with a little girl are just seen on the lower left hand corner of the canvas descending a flight of steps at one end of the bridge. The head of a boatman, with his hand pointing to the river, is apparently soliciting hire, while below him, on a return flight, is seen the head of another dark mulatto-like man, also eager for engagement. These figures, or rather heads, are wonderfully painted, and give a scale to the grand perspective of the bridge which crosses the river. To add to the effect of descent, the artist has cleverly introduced the back of the head of a golden-haired woman in the half-landing. We cannot speak too highly of the solid luminous side of the bridge, and its reflection in the smooth swelling ripple of the blue river which flows beneath the arches. It has been objected by some critics, who affect accuracy, that the arches are not in true perspective, the second span being of a different curve to the others adjoining it; but it is evident the artist has here intentionally shown a bridge in which the arches vary, and are of different width and curvature, as may be seen by the sudden drop of the line of the parapet in the distance. The end openings were evidently intended to be different, and we can hardly impute to a painter of such masterly architectural detail a want of correct drawing in so easy a matter. At the farther end of the bridge a triumphal arch spans the roadway, while in the spandrels are introduced pedimented niches with bronze statues. These are marvellously painted, and stand out in the sunlit recesses. The cornice, mouldings, and detail generally are very carefully drawn, and the structure reminds us of an Italian bridge that spans the Arno. The colouring, however, is exceed-

ingly rich and sparkling, and the handling spirited; the deep blue of the sky over the warm-toned stone, and the rich colours in the water, make up a glowing canvas. "A Hearty Welcome" is a small panel subject, representing the interior of a conservatory, surrounded by buildings of Italian character. Flowering shrubs, cactuses, sunflowers, poppies, and other plants are introduced, with a truth, delicacy, yet breadth of manipulation that is remarkable. Viewed with a large magnifying lens, the blossom and the leafage look like reality itself; every leaf and flower is delineated with a microscopic faithfulness which only a photograph can give, and yet the eye is not distracted with minutiae. Mr. Tadema seems to possess the power of rendering his pictures with faultless and minute detail, at the same time that he never wears the observer. His foliage is nothing but a dexterous effect produced by a dry brush with masterly precision, and the same may be said of his sunflower and blossoms. Figures of a lady and girl clad in Italian garments are introduced, and, we understand, are portrait studies of Mrs. Tadema and her little girl, while a dark-robed figure is approaching by a staircase, intended for the painter himself. The play of sunlight on the coloured pilasters, the carved marble entablature which appears in the distance, and the figures are marvellous. In the "Feast of Pomona," another even smaller cabinet picture, the artist has given us an episode of old Roman history, in which Pomona, the divinity of garden produce, is the subject of festive dance. Mr. Tadema seems to have caught the very spirit of the festival, and we might imagine his picture to be almost a reproduction in colour of Varro's description of these special services to the honour of the tutelary goddess. The apple-tree, with its blossom, round which the figures are shown dancing, the frescoed garden wall, over which a fringe of bright green leaves and blossom appears; the altar; the marble border and hyacinths, are wonderful in their microscopic minuteness and spirited execution. In "The Time of Constantine" we have an episode of old Roman life, told with similar dramatic power. The story told is exceedingly simple. A wealthy citizen is entertaining a friend in his garden. Both are seated, amused by the begging attitude of a dog, which is resting on its hind legs. But the surrounding adjuncts make up the picture, the most striking point in which is the grey, cold marble and statuary in the shade of which the host and guest sit, the reflected green light on the coping of wall, and the bright green leaves on the other side. We can almost fancy, as we look into the picture, the reality of the marble. Another small piece, in water-colour, entitled "Strigils and Sponges," is probably suggested from the old Roman Bath. The stooping figure of the undressed lady in the fountain, and the attendants—one dark, and the other with golden hair—the transparency of the water, the splash in the basin, is almost suggestive of allegory. The only regret we feel is that these exquisite cabinet pictures should have been painted so small, worthy as they are of larger canvases; and unless placed within accessible distance, we are afraid they will be lost by the side of larger and bolder pictures. Mr. Alma Tadema can paint both large and small pieces with equal boldness and delicacy; but these pictures are almost as surprising in their disparity of scale as they are in dexterity of execution.

IRON PIERS.

THE employment of wrought iron for the piles of bridges, piers, and other structures, has necessitated attention to bracing and other modes of connection and strengthening. Bridge piers usually consist of a number of piles sunk into the bed of river either by screws or pile-drivers, connected together by cross braces, the tops receiving caps, upon which the girders rest. Clusters of two, four, or more columns or piles, connected by ties, form the piers, and these are generally braced together by angle-iron bolted to ears or lugs, which in cast-iron columns are cast at intervals in the height. We here call attention to one or two modes of connecting piles of wrought-iron. One very useful method employed in structures of the class we are considering is to join the bracing bars to the upright piles or columns by means of clips, which surround the column on three sides and project as

lugs, which latter receive the bracing bars. These are generally round, made flat at the ends, with eyes, and are bolted through the lug or projecting part of clip. One advantage of this method of connection is that the clip may be adjusted to suit the bars, or rather the unsupported length of pile. In adjusting tie bars the screw shackle is employed, by which the length of tie can be regulated to a nicety by turning the shackle. This kind of adjustment is evidently required where the piles cannot be driven with accurate verticality. The sizes of these bracing bars and ties must in all cases be regulated according to the requirements of each case, and no rule can be given. The fact is that bracing of this description is exposed to strains of an irregular kind that cannot be estimated. Mr. Stoney, in his able work on the "Theory of Strains," observes: "Cross-bracing generally fulfils two functions—it acts as a horizontal web holding the compression flanges at short intervals in the line of thrust, and thus preserving them from lateral flexure, to which all long pillars are liable; it also braces the whole structure in a horizontal plane, stiffening it against vibration, and to resist the side pressure of the wind." He also recommends counterbracing the cross-bracing. In the case of braced pillars, the same writer remarks: "In long pillars it is desirable to connect each pair of compression bars by internal cross-bracing." He, in fact, regards the pillar as a girder, each of whose flanges is subject to a longitudinal pressure. From Hodgkinson's experiments on plate-iron tubular pillars it is probable that the strength of braced pillars is within certain limits independent of their length, for internal bracing is generally somewhat stronger than theory requires. Mr. Stoney adopts in practice 4 tons per square inch of gross section (excluding the cross-bracing) for the working strain of wrought-iron braced pillars. He regards each bay of a braced pillar as a pillar with rounded ends. It is obvious such a pillar resembles the compression flange of a girder, and this is the right manner of regarding it. As regards the sectional forms of braces, angle-iron seems to be admitted the best to resist vibrations, as long, round bars and flat ties offer little resistance to gusts of wind or violent waves.

The modes of lengthening pillars of wrought-iron are by couplings and flanges. Couplings are best made of steel, secured by bolts. Flanged rims, through which bolts pass, are generally adopted in cast-iron uprights and pillars, though various ingenious modes of lengthening will suggest themselves to the skilful engineer and architect. In the construction of iron light-houses and beacons, considerable opportunity for structural and artistic modes of connection offers itself. As a general principle, however, we consider clusters of pillars, disposed in T shaped, triangular, and quadrangular forms, braced together, to be the stiffest and most satisfactory mode of erecting structures of this class.

THE BUILDING TRADE AND THE BY-LAWS OF THE METROPOLITAN BOARD OF WORKS.

ON Monday a numerous deputation waited upon Mr. Cross at the Home Office to ask him to withhold his approval from the by-laws promulgated by the Metropolitan Board of Works under the 16th section of the Metropolitan Management and Building Acts Amendment Act, 1878. Sir James Lawrence, M.P., and Mr. O. Coope introduced the deputation. The by-laws were framed to prevent the erection of "jerry" dwellings—houses erected of bad material on plots of land which in many cases had been mere "lay-stalls" for garbage from London dust-holes. These houses, having had their imperfections covered with stucco, were sold at an enlarged, or, as it has been called, an "improved" ground-rent to persons who found too late that they had become possessed of insanitary dwellings constantly needing repair. The deputation, it was said, did not represent the large builders, but the men who by their brains had made their own way. Sir James Lawrence declared that some of the by-laws made by the Metropolitan Board to govern the erection of buildings were impracticable, and it would be impossible to carry them out. He objected to the rules that concrete was to be used in all cases under walls, and that the filling up of holes under houses to be built was to be with

"hard brick rubbish, or other similar material." He also objected to the provision that "good square, sound, well-burnt bricks" should be used for the internal walls as well as for the external walls, and to the regulations for the composition of the mortar—"good lime and clean, sharp sand, which has been properly washed, or grit, in the proportion of one of lime to three of sand or grit"; and he regarded the rules as placing unnecessary restrictions upon builders. He also criticised the powers given to the district surveyors under the rules. Mr. Coope said he held that it was important that houses for the working classes should not only be constructed with a due regard to the necessities of health, but they should be cheap, in order that rents should be kept down. He knew that in some parts of London houses had been so built that it was impossible they could be healthy dwellings; but he thought that consideration should be given to the point that while care was taken to guard against such erections, there should not be rules to prevent the erection of cheap houses for the poorer classes. Several builders then addressed the Home Secretary, and some of them expressed themselves as very impatient of the powers given to the district surveyors, urging that sufficient safeguards for the public existed before the appearance of these rules. The rules themselves were declared to be "an interference with the liberty of contract," as against "freedom of action," and it was stated with some bitterness that the reports of Dr. Tripe, the medical officer of health of Hackney, regarding erections called dwellings in that district, had led to the stringency of these rules, which, if carried out to the full, would be very detrimental to those rent-paying classes of London and the suburbs who paid between £20 and £50 a year. Mr. Cross, in reply, said that the Metropolitan Board of Works had prepared these rules, and that body was empowered under statute to prepare building by-laws in order to secure the public health and the public safety in the area of the metropolis, such by-laws when approved of by the Home Office having the full force of law. Whether the objections which had been raised by the deputation as to the too great stringency of these by-laws were well founded was a matter which should have his most careful consideration; more than that he could not say. The deputation then retired.

BRITISH ARCHEOLOGICAL ASSOCIATION.

THE eighth meeting of the Session was held on Wednesday last, Mr. H. Syer Cuming, F.S.A. (Seot.), in the chair. The progress of some excavations for building purposes, in the Borough, Southwark, was reported by Mr. Earle Way, who described a large number of Roman relics found there. These consisted of fragments of earthenware vessels of large size, and a perforated flint, the "Hag stone" of popular superstition, and which was hung upon stables to prevent the horses being ridden by the hag, as the effects of nightmare were called. Its occurrence 15ft. from the surface appears to warrant the belief that the superstition was known to the Romans. Mr. Cuming exhibited a beautiful chataleine or "equipment" of Pinchbeck's manufacture and metal. Mr. Loftus Brock, F.S.A., produced in illustration of one of the papers, a large collection of Greek and Etruscan pottery, exhibiting much diversity of form. Dr. Phené called attention to several remarkable peculiarities of the articles. Mr. Thos. Morgan, F.S.A., then read an elaborate paper upon Etruscan Art and having reference to the remarkable tomb recently discovered at Praeneste, in Palestine. After tracing the course of art among this ancient people through the Archaic, the Greco-Etruscan, and the Romano-Etruscan styles, illustrating his remarks by a large collection of plates and drawings, he proceeded to describe the tomb in detail. It is an oblong sepulchre, the sides corresponding to the points of the compass, 18ft. long by 13ft. broad. The ceiling was flat—in this particular, and in the style of the ornaments found, indicating a high antiquity. There had been a bier in the centre, where was found a plate of gold with small amulets. Many ornaments of Egyptian character were found, together with bronze nauges, silver dagger-sheaths, and iron handles. The period of the interment might with safety be assigned to the 6th century before Christ. The whole of the objects have been purchased by the Italian

Government for 70,000 francs. Dr. Phené reported the results of excavations made by him in Etruria, illustrating his remarks by a large collection of drawings, among which the tombs of Castel d'Asso, of vast extent, were dwelt upon, and the opinion expressed that some of these had originally been the dwellings of the occupants. They are cut out of the solid rock, having what appear to be doors, but the openings are elsewhere.

MR. STREET'S RESIGNATION OF THE V.P. OF THE R.I.B.A.

WE are informed that the reason given in our announcement last week for Mr. G. E. Street's retirement from the Council of the R.I.B.A.—which was taken from the Institute Circular—is incorrect, and omits all reference to the reason stated by Mr. Street in his letter to the Secretary of the R.I.B.A., which we publish.

[Copy.]

DEAR MR. WHITE,—This year (and next year it will be same) so much of my time is taken up by serving on the Council of the Royal Academy, that I really have no time to spare for other similar duties, and as under the present system at the Institute of Architects any chance of getting new blood into the Council ought to be seized, I feel that I ought to resign my post as Vice-President and Member of Council. Will you be so good, therefore, as to take care that my name is struck out of the house list?—Believe me, yours very truly,

(Signed) GEORGE EDMUND STREET.

14, Cavendish-place, Cavendish-square, W.

March 20th, 1879.

W. H. White, Esq., Secretary R.I.B.A.

EXPERIMENTS ON THE TESTING OF PORTLAND CEMENT AND BRICKS.

IN a recent discussion on a paper read by Mr. Maclay, before the American Society of Engineers, some important facts relating to the subject of cement induration were cited. Mr. Don J. Whittemore very justly observed that in experiments undertaken in relation to cements "nothing satisfactory can be done without first taking every precaution and refinement in measuring, weighing, and manipulating that can be devised in preparing specimens, and that the resulting tests are of little relative value unless all specimens are exposed to the same temperature." As Mr. Maclay pointed out in his paper, low temperature arrests the indurating process as it does chemical action generally, and Mr. Whittemore says his own observations lead him to the belief "that the action of heat and cold upon mortars of American hydraulic cements is more erratic in character than upon Portland." He also says that water which has absorbed the most carbonic acid will always be found the best for immersion in hastening the indurating process, and this statement he corroborates by the example of sewer-water immersion, though dirty water may contain elements injurious to the cement. The same authority gives the result of placing briquettes of pure cement in a bath of water vapour, constantly saturated with carbonic acid, for a period of 52 days. While these showed a tensile strength of 345lb. per square inch, specimens of the same cement immersed in fresh water for the same period, broke at an average of 156lb. per square inch. We quite agree with the remark, that no system of testing is complete which does not give the values for strains such as crushing and breaking, as well as tensile strength—the favourite test. Engineers and architects specify a certain tensile strength for Portland cement, but in nine cases out of ten, the cement is seldom required to resist any other force than compression, and it is evident the tensile resistance does not always indicate the resistance of cement to crushing or cross strain. Mr. Whittemore's experience in testing is that for at least two years, cement mortars never retrograde in tensile strength, but increase approximately in proportion to some root of the age; for a fair quality of Portland the index of this root is 10, and the expression is

$S = A \sqrt[10]{T}$ in which S = strength at the age T, and A is a factor determined experimentally, by dividing the known strength at any age of sample, by the 10th root of its age. It is shown that this formula accords very closely

with Mr. J. Grant's observed strengths (p. 122). If the strength value of Portland cement is to be determined only by tensional strength, says the author, the sooner the usual seven-days tests are discarded the better, for substitute tests at 20, 40, and 60 days. Mr. F. Collingwood referred to some results of experiments on American cements and bricks made at the East River Bridge, a diagram of which is given in the "Transactions." One of the chief points of interest in this diagram of curves "is the rapid increase in strength up to about 7 days, then a depression in almost all cases up to the 14th day, and then the marked and steady increase. The first period would seem to indicate the close of the formation of hydrates, and the next rise the beginning of the formation of crystals of silicate of lime, &c." The experiments also indicate another important fact, "that there is no certain ratio between tensile and compressive strength, and that the ordinary tests are of little value in determining the true relative merits of different cements. Mr. Collingwood's tests of brick under compression and tension are useful; those of whole bricks on end gave a minimum compressive strength per square inch in ten tests of 1,600lb., a maximum of 3,060lb., and an average of 2,065lb. On the side the figures were—2,900lb. minimum, 6,400lb. maximum, and 4,612lb. average. Ten bricks were then broken on the flat, and to the surprise of experimenters, the minimum gave 2,669lb., maximum 4,153lb., and average 3,371lb. The less amounts are attributed to imperfect bearing surfaces. As regards tension, the minimum strength recorded was 90lb. per square inch, maximum 358lb., average 168lb.—about equal to the best cements at the end of 21 days. The conclusion derived from these experiments can only be that brickwork has considerable strength as a beam—one that is invariably borne out by old and good brickwork, where the joints are properly filled up.

COMPETITIONS.

TIVERTON.—The Governors of Blundell's school, Tiverton, met on Monday, when the plan of Messrs. Haward and Son, Exeter, for the recreation of the new buildings at Horsdon was selected as the best and approved, provided contracts could be obtained within the sum specified, £11,000.

CARDIFF.—The first premium of £50 has been awarded to Mr. G. A. Lundie, M.I.C.E., of Cardiff, for his scheme for the sewerage of the town. It is proposed to deal with the sewage on eight acres of land by intermittent downward filtration, and the whole of the works are estimated to cost about £5,000. The local board advertised for plans, specification, and tenders, and there were twenty competitors.

SCHOOLS OF ART.

SOUTHAMPTON.—The annual distribution of prizes to the students of the Southampton school of art took place on Thursday week. The report stated that in April last the students' drawings were submitted to an examination at South Kensington, when eight works were selected for national competition, four third grade prizes were awarded, one free studentship was granted, six students were commended for advanced, and six for elementary work. Three of the prize works—a painting from a bas-relief by Miss A. Colson, and two landscapes by Mr. R. McFadden (one of these was purchased by the Department Examiner)—were publicly exhibited at South Kensington during last autumn. The other prize works were two heads from life by Miss E. Harty, and a drawing from the figure and from ornament by Mr. G. H. Thompson. In May last the annual examinations in freehand, model, geometrical, perspective, anatomical drawing, and designing took place, when forty-eight students sat. They worked twenty-eight papers successfully, thirteen of them being excellent.

The peal of bells at Ashburton Church, Devon, are about to be raised from six to eight. The additional bells are being manufactured by Messrs. Blows, of Birmingham.

Last week the erection of one of the great towers of the Forth Bridge, on the Island of Inchgarvie, was commenced by Mr. John Waddell, contractor, Edinburgh. The towers, of which those on Inchgarvie are to form the centre supports, will, when the ironwork is complete, be upwards of 500 feet in height.

Building Intelligence.

ASTON.—A new assembly room at Aston, near Birmingham, was opened on Monday. The assembly room will seat 4,000 persons, and is, with the stage, 220ft. long and 87ft. 3in. wide. The height from floor to roof is about 50ft. The prevailing colours of the decorations are amber and blue, interspersed with maroon, the ornamental portions being relieved with gold. An aquarium is not yet completed. In length it will be about 340ft., and in width 56ft. The exterior is of red and white brick, and the building is surmounted by a tower nearly 90ft. high. The chief promenade is 311ft. long, and on either side are large tanks similar to those at the Brighton and other aquariums. Encircling the top part of the building is a terrace promenade, 330ft. in length. The superintendence of the aquarium is undertaken by Mr. W. A. Lloyd. The buildings have been designed by Mr. Thos. Naden, of 14, Temple-street, Birmingham; the aquarium has been erected by Mr. John Garlick; and the assembly room by Mr. Wm. Bloore.

HEXHAM.—On an eminence near the outskirts of Hexham, has been erected a pile of buildings, henceforth to be known as the Tyne-dale Hydropathic Establishment. They are built of stone in the Italian style by Messrs. Reed, contractors, Newcastle, after the plans of Mr. W. L. Newcombe, architect, Newcastle. The building forms three sides of a square, the principal entrance facing east, with a second main entrance on the south; while the baths, on the west, fill up the fourth side of the square. It consists of the basement and three stories, each flat, with slight variations, being a repetition of the other. Each bedroom is exceedingly high, and any bad air which might accumulate is carried off by one of Boyle's patent ventilators. Dr. Richardson's plan of cooking in an upper room has been followed, and the kitchen, the floor of which has been cemented, and which is fitted with Benham's cooking range, is situated over the dining-room, so that all objectionable odours from the cooking find their way upwards and outwards. The building, including everything, has cost £13,000.

HOLYHEAD.—The parish church of St. Cybi, Holyhead, one of the oldest and most interesting ecclesiastical antiquities in Wales, its foundation presumably dating from A.D. 650, has just been reopened after restoration from the designs of the late Sir Gilbert Scott. The old galleries have been removed, the interior has been excavated to a depth evidently the original base of the building, and the roof replaced by one of carved oak, the centre boss in the nave bearing as a record of the restoration the crest of the Stanley family, who have subscribed towards the outlay of £6,000 expended upon the work.

KINOUSSIE.—A new Free Church was opened near the railway station, Kingussie, N.B., on Thursday, the 3rd inst. It measures 56ft. by 40ft., and is 21ft. high to plate of walls. It is built of blue whinstone, and the fittings are of pitch-pine. The chief entrance is at the south through a porch surrounded by turret and bell, while at the north end is a vestry. On the platform is a chair in carved walnut and maroon plush. There are galleries on three sides, and the roof is an open one. The style is Gothic, and accommodation has been provided for 600 people at a cost of £1,600. Mr. Laurie, of Inverness, was the architect, and the chief contractors were:—Masonry, Messrs. Mackenzie and Macdonald, Kingussie; carpentry, Mr. Laing, Forres; slating, Mr. Catanach, Newtownmore; plastering, Mr. Alves, Forres; plumbing, Mr. Ross, Kingussie; and painting, Mr. Chisholm, Kingussie.

METROPOLITAN BOARD OF WORKS.—At this board on Friday it was reported that the two new fire-brigade stations in Chapel-place, Brompton-road, and at Shooter's-hill will shortly be ready for occupation, and it was decided that twelve men be added to the staff of the brigade, and that four new manual engines, two fire-escapes, thirty 100ft. lengths of rubber-lined canvas hose, and eight manual suction-pipes be obtained, to be placed at the new stations. In reply to questions, Mr. Edwards stated that the various makers of fire extinction apparatus were asked some time since to tender for the supply of four steam-engines, &c., to those now required, and Messrs. Shand and Mason's tender was the lowest re-

ceived (£380 each), against Messrs. Merryweather's tender of £390. The engines had been obtained, therefore, from the former firm, and it was proposed also to obtain the appliances now required from Shand and Mason's. Considerable discussion took place on the general question of tenders, but eventually the proposal of the committee was approved, and also the purchase of engines. The fire brigade committee were authorised to obtain a site in the neighbourhood of Sloane-square on which to establish a fire-brigade station. A contract was sealed with Messrs. Laing for erecting a keeper's lodge on Tooting Common. The engineer reported the death of Mr. James Macleary, surveyor, who had been in the service of the board for twenty-five years. A letter was received from Sir H. A. Hunt, transmitting a copy of his final award in connection with the Old Pye-street Improvement Scheme, under the Artisans' and Labourers' Dwellings Improvement Act, 1875, deposited with this board as the local authority.

RADCLIFFE.—The new co-operative stores are now completed at Radcliffe. The secretary's office and board-room, each 30ft. by 22ft., are upon the first-floor. The news-room is a well lighted room 52ft. by 25ft., with a panelled pitch-pine ceiling handsomely furnished in pitch-pine, with newspaper stands, tables, seats, writing-desk, reference library, &c., all especially designed for the room. The library and conversation room are arranged in convenient juxtaposition. The remainder of this floor is occupied by store-rooms for the grocer. The exterior is a neat brick building with stone dressings. Decoration, wherever introduced, is composed of combinations of ordinary stock bricks. The work has been executed by local contractors at a total cost of nearly £15,000, from the plans and under the superintendence of Messrs. Maxwell and Tuke, of Bury.

SCHOLES.—At Scholes, on the Leeds and Wetherby line, a new Wesleyan chapel was opened on Wednesday week. The chapel, which has been built from the design of Mr. G. F. Danby, architect, Leeds, is in the Gothic style of architecture, and is built of pressed bricks relieved with black bands and stone dressings. The dimensions inside are 36ft. by 26ft., and 23ft. high, and it will accommodate about 150 adults; the roof is an open-timbered one, covered with dressed boards, felt, and Westmoreland slates. The principal contractors are Messrs. Marshall and Sons, of Crossgates, for the bricklayers' and masons' work; and Mr. J. Tomlinson, of Leeds, the joiners' work.

SCORTON.—A new church is being erected at Scorton, near Lancaster, and will soon be completed. It is in the 14th century phase of Gothic, and is built of local ashlar. The internal dimensions are: nave, 52ft. by 20ft.; north aisle, 52ft. by 13ft.; chancel, 31ft. 9in. by 20ft.; organ-chamber, 14ft. by 13ft.; vestry, 15ft. 6in. square; and south porch, 10ft. by 9ft. 6in. There is a tower 49ft. high, capped by octagonal oak-shingled spire, which rises 33ft. more. In this tower will be a peal of six bells from Messrs. Warner's foundry. The eastern window of church is filled with stained glass in five lights, the subjects being taken from the lives of our Lord and of St. Peter. The chancel floor is laid with tiles from the works of Messrs. Craven, Dunhill, and Co., of Ironbridge. The open benches and upper part of pulpit are of oak. The roofs are of pitch pine, felted and covered with Staffordshire tiles. The church seats 250 persons. The contract for masonry was taken by Messrs. Wilson and Kirby, of Longridge; and that for carpentry by Mr. Blades, of Lancaster.

An area of about 90 acres of land on Wandsworth Common on the right of the South Western line, and extending from the Wandsworth Prison to Garratt-lane, has been purchased by Mr. Robert Davis, and is about to be covered with residences for the middle-classes. The plans have been drawn up by Mr. T. G. Lynes, of St. John's-hill, Battersea, and as approved by the Metropolitan Board of Works, show a series of villas, averaging in cost from £800 to £1,000 each on plots, with 40ft. frontages, and depths of from 100ft. to 180ft. The contract for making the principal thoroughfare, to be known as Earlsfield-road, has been given to Messrs. Robert and George Neal, of Wandsworth-common; we publish the list of tenders sent in on another page.

The peal of eight bells in Brigg church has just been completed, by Messrs. Warner & Sons, bell-founders, of London.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—E. H. E.—W. R. L.—S. J. N.—B. L. and Co. J. and H.—G. O.—G. E. H.—D. C.—J. H. B.—B. of A. F. I. and Co.

J. P. NORMAN. (We know of no work that gives exactly the information you seek, but there is an article on hydraulic machinery in Spurr's "Dictionary of Engineering," and, so far as mining appliances are concerned, in Ure's "Dictionary." Knight's "Dictionary of Mechanics" illustrates several forms of water motor, and gives brief explanations. Messrs. Bailey, of Salford, make water engines of different types.)—W. J. J. (Claridge's is the best. Mr. J. Farrell, Victoria Embankment, W.C., would probably send particulars on application.)—A. C. P. (We cannot interfere. We have already said all we have to say. You can, of course, reply to the rejoinders which have appeared if you wish, but we think the subject has already occupied as much space as it is worth.)—ENQUIRER. (The lighter body would occupy more time in its descent.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—East Anglian, Motto, J. Signum, Dunwich, M. with Leaves, Essayer, Factable, Osmore, Try, Veritas Vincit, Josephus, Orange Blossom, Be to its Merits, &c., Pogmore, Melina, Myletus, Steffano, Honey Dew, Nemo, Noah, Antediluvian, David Waterhouse (drawings of screen returned with thanks), N. Joyce, D. B. Dick, Toronto. (The drawings of houses contain nothing special, but we acknowledge their receipt with thanks.)

LAST OF SUBJECTS.—1. A school chapel for a village, suitable for 60 children, vestry, and recess for chancel to be shot off by a movable screen, cloak-room, class-room, and lavatory. Plan, 2 elevations and sketch. Scale, 6in. to the foot. 2. A sketch for a hall chimney-corner, showing seat. Opening to be 3ft.

Correspondence.

A SCOTCH PROVOST ON ARCHITECTURE.

To the Editor of the BUILDING NEWS.

SIR,—I inclose a paragraph from the *Scotsman* of to-day, from which you will see that the learned Provost of Greenock has been "going for" the Liverpool and Manchester Architectural Associations, because they ventured to express their disapproval of the penny-wise and pound-foolish course the Council were pursuing in cutting down their architects' commission from 5 to 4 per cent. What a wiggling, Sir, the R.I.B.A. would have got from the Provost if they had spoken out pluckily on the matter! It is said that England is the last country to take

up any general movement of the European mind, but how about Scotland? My object in writing this letter is to try and induce architects to stick together and form a real trades' union, to protect them against the shabby treatment of town councils and vestries, and they will then be able to snap their fingers at the abuse of a Scotch provost.—I am, &c.,

April 8th.

J. R. A.

THE PROVOST OF GREENOCK AND ARCHITECTURAL ASSOCIATIONS.—At the time the Greenock municipal authorities issued invitations to architects for plans for the extensive new municipal buildings, they agreed that the rate of commission to the successful architect should be 4 per cent. on the full cost of the building, the estimate for which was not to exceed £80,000. Upwards of eighty architects at once entered as competitors on the terms proposed; but the Liverpool Architects' Association wrote to the Greenock Town Council complaining of the lowness of the rate of percentage, and stating that it was considered derogatory to a professional man to give his services for less than 5 per cent. for the class of building referred to. At the monthly meeting of the Greenock Town Council, a letter was submitted from the Manchester Architectural Association making the same complaint, stating that they considered that the stipulation of 4 per cent. had a great tendency to lead to questionable practices, to the discredit of architects, and to the disadvantage of their clients. The Council unanimously resolved to adhere to the 4 per cent. commission; and the Provost, referring to the Manchester complaint, said he had not a particle of sympathy with these associations. People were apt to speak harshly against the working men who form trade unions, but this was as complete a trades union as had ever existed amongst working men.

Intercommunication.

QUESTIONS.

[5725].—**Substitute for Mortar.**—Wanted to know the best substitute for lime-and-river-sand mortar, which is often falling off and gets soaked full of wet. Tallow and tar both have been uselessly used on the surface. The walls of the house for which it is wanted are of brick, built 20 years ago. The east end is 46ft. by 44ft., exposed to the weather. The west end has 46ft. by 24ft. exposed to the weather. Of these, which are the best to adopt, or what otherwise? Tile or slate nailed on laths, and common mortar, or Portland cement one part, river sand two parts, in two coats, fluidising with lin. in thickness? Whose cement is to be preferred?—A. S.

[5726].—**Breaking Weight of Girders.**—Could any of your readers kindly give a reliable formula for calculating the breaking weights of the following girders:—1. A girder composed of a rolled joist with a plate on the top. 2. A girder composed of a rolled joist with a plate on the top and a plate on the bottom. 3. A girder composed of two or three rolled joists with plates on top and bottom.—T. W. LEEDS.

[5727].—**Slating.**—I am desirous of using thick green or grey slates of small size, and not smooth surface. Will some one kindly inform me as to cost as compared with tiles south of London, and also briefly describe the slating, stating how laid and upon what?—H. B.

[5728].—**Coloured Building Stone.**—Can any one give information as to Findon stone? There was an agency for it in Southampton-buildings many years ago, which has disappeared. The stone was brought by water up the Thames. I should be glad to hear of any available quarry of yellow, red, or brown walling stone, which could be brought to London by water at moderate cost.—W. W.

[5729].—**Pointing Red Brickwork.**—I am about to have pointed some red-brick faced houses I have just erected. Will some of your readers kindly inform me if Abertaw lime, with a little London cement and fine sand added, are the best materials for such purpose? If not, what are? Also what colour is the pointing of red brick buildings now erected finished in? Also I should be glad to know the joint, &c.—CONSTANT READER.

[5730].—**Softening Putty.**—I have some old sashes glazed with plate glass, and I wish to take it out without breaking. Will someone experienced kindly say the best way of softening the putty of same?—T. P. B.

[5731].—**Concrete Steps.**—What is the proper proportions of cement and gravel to be used for the making of concrete steps? Would some of your readers who have had experience in this kindly give particulars?—O.

[5732].—**Rats.**—Can anyone suggest a means of filling in behind skirtings and stowings in an old country mansion so as to prevent the rats from having free run of the house? Any information as to a successful method of getting rid of these pests will be thankfully received.—G. D. I.

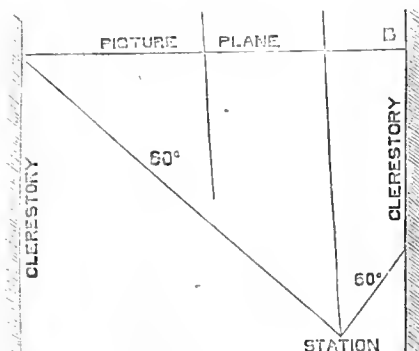
REPLIES.

[5706].—**Labourers' Cottage Fittings.**—In reply to your questions, an ordinary barred grate is certainly as useful as a range for the ordinary class of labourers, but for cottages professing to be built for intelligent occupants a small range is to be preferred. There are numerous ranges, costing about £3, to be obtained at most ironmongers.—G. H.

[5703].—**Stone Floors.**—For stores and warehouses, the best kind of floor (fireproof) would be concrete and iron, the iron being placed either in girders or as ties

only in the lower portion embedded in the concrete. Girders 13 or 14 in. deep, made of two 12 in. rolled joists, with 5 in. flanges, united by flange plates—making box girders, may be placed 10 to 12 ft. apart. Rolled joists, 4 in. deep, may be fixed between at right angles or iron ties, only about 3 in. apart upon and round which network of iron the concrete is filled in. A solid concrete floor may be formed also of simple iron rolled joists placed about 2 ft. apart, embedded in concrete. These floors are better than stone of the kind mentioned. The way to calculate the weight a stone floor will carry is to find out the weight one of the beams will carry safely, or how much of the distributed load over the surface of floor (easily obtained) will rest upon it. This obtained, the number of beams employed will give the total weight per square foot or yard. Of course each beam carries an area of stone between it and the next beam.—G. H.

[5700].—**Perspective.**—"Perspective" begs to thank Mr. Ambrose for his exhaustive description of interior perspective, which, doubtless, will be interesting to many besides the writer. There is only one matter not quite distinct. In cases where the station is out of the centre, and a line of 60° (or 30° on each side) is drawn therefrom to picture plane, where is the limit of vision on the near side, at A or at B? I presume the picture plane must



always be parallel with the eastern wall. If Mr. A. would kindly give us a small diagram it would elucidate the matter fully.—PERSPECTIVE.

[5722].—**Dilapidations.**—There are so many classes of dilapidations that it takes one a considerable time before he is able to answer "straight away," as the Americans have it, a client, who in all probability is a solicitor, on any and every building or repairing question with reference to the liabilities and responsibilities of lessors and lessees, building and adjoining owners, &c., but "Tweedie's" two questions will, I think, be answered as follows:—1. If the covenant to repair be the usual one—i.e., to uphold, maintain, and leave in good condition at the expiration of term, &c.—the lessee is bound not only to repoint defective mortar joints, but also to cut out any defective, rotten, or perished bricks and renew same, and where a wall or chimney shaft is so far out of the perpendicular as to necessitate rebuilding; or, if in London, to bring it under the Metropolitan Building Act, part 2, LXXII., the lessor can compel the lessee to bear the expense of said pulling down and re-erection, except as to part thereof in cases of party structures, as will be found explained in answer No. 2. I have found in settling many dilapidation matters that the age of premises has little or nothing to do with the question (as the lessee in most cases undertakes to keep them in thorough repair) unless they have been in the hands of the same lessee for more than fifty years, and he can show a considerable expenditure for reinstatements, and that is only taken into consideration by the surveyors in settling money claims for dilapidations after the lessee has vacated the premises after notice to repair, without performing the works stipulated in such notice, but it has been ruled that when the lessor stipulates particularly and distinctly the exact amount and quality of the repairs and reinstatements he requires, the lessee is not liable to do anything more to the premises than the specific repairs, &c., alluded to in the notice, and a money claim for dilapidations in such a case would, in my opinion, be barred, should the lessee have performed all the works so set forth previous to giving up possession. 2. The building owner—i.e., the person upon whom notice (under the Metropolitan Building Act, part 2, LXXII.) is served, is bound to conform to it, otherwise the board will take the matter in their own hands and saddle the expense upon him. When, however, the building owner does perform the works specified in said order, he is entitled under the Act within one month from date of completion of same to render to the adjoining owner an account of the cost of such work so far as it refers to any party structure and other portion of premises disturbed through the demolition of the same, and the adjoining owner is liable to the building owner for half the cost of pulling down and re-erection said party structure and any surveyors' expenses in connection therewith, but should the building owner in rebuilding raise such party structure higher than it was formerly, the adjoining owner is only liable for the cost of half that portion of the wall that is necessary for the joint use of both owners, regard being had to the use that each owner makes or did make of such structure. A notice under Metropolitan Building Act, part 2, LXXII., renders the person upon whom it is served liable for the total expense in case of rebuilding party structure (unless he can previously arrange with the adjoining owner) until such time as he renders an account to the adjoining owner—Metropolitan Building Act, part 3, LXXXVIII. 2, and Metropolitan Building Act, part 3, LXXXIX.—but at the same time it frees the building owner from the responsibility of serving the usual three months' party structure notice upon adjoining owner, and all the delays and disagreements that usually follow in its wake.—J. L. SIKWART, Architect.

Mr. W. Johnson, of Newmarket, has been appointed surveyor to that town by the Newmarket Local Board of Health.

WATER SUPPLY AND SANITARY MATTERS.

MERRIOTT.—Lieut.-Col. Ponsonby Cox, Inspector under the Local Government Board, held an inquiry at Merriott, Somersetshire, on Wednesday week relative to a petition by the Chard rural sanitary authority for a provisional order to enable them to take lands by compulsory purchase for the disposal of sewage. It was stated that Mr. Stevenson, an engineer, was employed by the Chard authority to prepare plans for the drainage of the parish, the estimated cost of the work being £2,000. For the drainage of the Lower-street a second set of plans were subsequently prepared by Mr. Brake, of Crewkerne, and the cost of these was estimated at £900. It was proposed to give two sites for the disposal of the sewage, for the outfalls of the higher and lower levels respectively, and the present inquiry was as to obtaining powers to acquire that for the upper district.

SALFORD.—The storage reservoir at Highfield, Salford, which has been in course of construction about eighteen months, is now very nearly completed. The contractor is Mr. C. W. King, of Wigan. The embankment rises 20 feet above the ground level, and is at the base 106 feet thick. Running through each side is a stout puddle wall, and below the ground level a puddle trench 12 feet deep, rendering the embankment at once firm and water-tight. The reservoir is constructed to hold about eight million gallons. The total cost has been upwards of £8,000.

LEGAL.

AN ARCHITECT'S COMMISSION.—At the Hull County Court last week, before Judge Bedwell, Mr. W. P. Burkinshaw, accountant, Hull, brought an action, as trustee under the liquidation of Mr. Bruce, an architect, against Mr. Joseph Ion, 'bns proprietor, to recover the balance of £50, being 2½ per cent. commission upon the estimated cost of certain buildings on the Hesse-road, which Mr. Bruce was engaged to superintend, as architect for the defendant. It was stated on behalf of the plaintiff that in November last the brother of the defendant waited upon Mr. Bruce, and in accordance with his wish, he called upon defendant in the evening. At the interview the defendant said he intended to build some property in Villa-place, Hesse-road, and he would leave his brother, Mr. William Ion, to make arrangements with him (Mr. Bruce). The defendant then went out of the room, and as a result of the conversation he had with the brother, Mr. Bruce measured the ground the following morning, and proceeded with the plans, sections, and elevations. He also prepared tracings of the plans, and took them to the defendant for his approval. Defendant said he had better submit them to the Corporation at once, and witness subsequently sent them in for approval. Mr. Bruce also drew up the form of the application usually sent in such cases, to which defendant signed his name, and the plans were passed in due course. All was ready for tender at the end of December, when Mr. Bruce sent in to the defendant a request for £30 on account. To this he received a letter from the defendant stating that he would pay him for work done, but as he had not decided to have the work done he could not think of paying him. After this defendant was seen personally, and he paid Mr. Bruce £5 on account, and he said that there might be an alteration in the elevation of the shops, as he did not think of building the houses for which a portion of the plans had been prepared. Defendant said he had no objection to pay 5 per cent. commission if the works were carried out, but he had an objection to pay 2½ per cent. if the works were not carried out. Mr. Bruce gave a receipt for the money, and had not received anything since. The defence turned upon the point what had been the instructions given to Mr. Bruce by Mr. Ion, and ultimately the jury returned a verdict for the plaintiff for £11 above the £9 already paid. The Judge granted the usual costs.

LOCAL BOARDS AND PLANS OF NEW ESTATES.—In the matter of the Workington Local Board. High Court of Justice, April 8, Queen's Bench Division. Sittings in Banco, before the Lord Chief Justice and Mr. Justice Mellor. This case raised a question as to the exercise of the power conferred by the Local Government Acts upon local boards of approving or disapproving plans for new buildings or laying out new estates. The Act of 1875, sec. 158, provides that where a plan of work is required by any by-law to be laid before the local authority, the local authority may, within a month, signify in writing, their approval or disapproval of the intended work to the person proposing to execute it; and if the work is commenced, and is not in accordance with the by-law, it may be pulled down and removed. In the present case the applicant had purchased a property in the Workington district, and proposed to lay it out in a certain manner and sent a plan to the Board. After a delay of more than a month, during which there was no approval or disapproval, his solicitor

wrote to them to ascertain whether they approved or disapproved, and upon that the clerk wrote to him to the effect that the Board could not pass the plan at present submitted, but that they were taking steps to enforce the laying down of a street 30ft. in width, in front of Senhouse-place, which would answer the object. Upon this the owner applied to the Board to know in what respects they disapproved, but could obtain no specific reply, and in the result, after a long correspondence, the owner applied to this court for a *mandamus* to the Board to approve or disapprove.—Mr. Waddy, Q.C. (with Mr. Roland), appeared in support of the application. Mr. Cowie appeared for the Board, against it, urging that they had sufficiently disapproved.—Mr. Waddy, on the other side, urged that the Board were bound not merely to say "We disapprove," but to state the grounds of their disapproval, or in what respects they disapproved, as otherwise the owner might be hung up for ever and prevented from dealing with his own land, unless he chose to go on at the risk of having the buildings pulled down by the Board. The object of the enactment evidently was the owner might be called upon to alter his plans in accordance with the views of the Board, and this could not be unless they stated in what respects they disapproved.—The Court observed that the Act did not, in terms, require that the Board should specify in what respects they disapproved.—Mr. Waddy: That is true; but the object of the Act appears to require it, and therefore, it is to be considered as implied, for otherwise the Board might act quite arbitrarily or for some collateral object.—The Lord Chief Justice observed that the Act did not specify on what grounds the Board might disapprove.—Mr. Waddy urged that they were restricted to the grounds specified in the Act, the level of the streets, their construction, and with these proper provision for sewerage, not the position of the streets, as in this instance. They had no right to disapprove on that ground.—The Lord Chief Justice: Then the owner can build?—Mr. Waddy: At the risk of having the buildings pulled down; but he ought not to be put in such a position, and is entitled to know beforehand in what respects the Board disapprove.—The Lord Chief Justice: But you say that they are not entitled to disapprove on this ground—that the street ought to be made elsewhere. Suppose the *mandamus* goes and they return that they disapprove, what remedy would you have? The Act appears to give none in terms.—Mr. Waddy urged that there must by construction be some remedy against an excess of jurisdiction or an excess of arbitrary authority, and there would be a remedy by *mandamus* to approve or disapprove, because in a return the Board must state on what grounds, or in what respects, they disapproved; and if they showed none on which they could legally disapprove it would be bad.—The Lord Chief Justice asked the counsel for the Board whether they were prepared to contend that they could force an owner of land to make his street in another direction from that which he proposed? To which he answered that he did not think he was compelled to go so far as that. Upon that the Court pointed out that the Act specified the matters in respect of which by-laws might be made, and which included the construction and levels of new streets, but not the direction in which they were made. Upon the whole, as the case appeared to raise legal questions of some difficulty and also some difficulty as to the facts, it would be better to grant the rule for a *mandamus*, in order that the questions that arose might be raised on the return. The Lord Chief Justice, however, observed that it was to be hoped that the parties would have the good sense to settle their dispute, as they might easily do. Mr. Justice Mellor quite concurred in that recommendation, observing, "These are expensive amusements."

Tenders are being prepared for Mr. Holloway's New College for Ladies, to be built at Egham. The design is by Mr. W. H. Crossland, and the quantities have been taken off by Mr. C. Batstone, and are unusually elaborate, extending to nearly 1,700 pages, of which some 200 pages are explanatory sketches. The bills of quantities have been lithographed by Messrs. Sprague & Co., 22, Martin's-lane, Cannon-street, E.C. The competition is a limited one, being confined to twelve selected firms.

At the April meeting of the Society of Biblical Archaeology, held on Tuesday, a paper by Mr. E. L. Lushington was read on "The Historical Inscriptions of Seti I. in the Temple at Karnak." The temple was enlarged by this monarch, who reigned B.C. 1455-1404. Owing to the destruction of the upper portion of the walls, many of the historical bas-reliefs are lost; but there still remains a copious record of Seti's victories, beginning on the north side, and relating to the Pharaoh's conquests in the earliest years of his reign.

The foundation-stone of a new Wesleyan chapel was laid on Friday. Mr. W. Botterill, of Hull, is the architect, and the cost will be £670.

Our Office Table.

THE present state of the home timber market, according to the *Timber Trades Journal*, is far from satisfactory. Those who sold early in the season had to submit to considerable sacrifices, and many of the lots were "bought in" in order to try them again later on. The trade is now even more depressed than it was then, and prices are not likely to advance this season. Good lots of clean ash are still in demand, and oak of large size and first quality can be disposed of at fair prices, but inferior descriptions of timber are almost unsaleable, and in many cases are converted into fuel. In some of the southern counties the timber which was cut and sold two years ago is not yet cleared out of the plantations. This is clearly locking up capital in a ruinous manner, as there is not only a charge of interest annually accumulating, but the timber itself is depreciating in value from exposure to the changes of a variable climate. It would be wrong to assume that these losses fall entirely, or even mainly, upon the purchaser. He occasionally makes a bad bargain, but in times of dull trade the loss falls principally upon the vendor. At a sale of timber a few months ago where the lots were all carefully measured and valued by a competent forester, his valuation was so much in excess of the highest prices offered at the sale that most of the lots were bought in. Since then at several sales where this precaution has not been adopted, some of the lots sold at prices which left a very large margin for locked-up capital and other contingencies. The only two descriptions of timber the writer has never experienced any difficulty in selling are larch and ash. These are saleable at remunerative prices in almost every corner of Britain. No other timber trees will realise such handsome profits in a given number of years; it is strange that ash as an independent crop is not more frequently planted.

THE last but one of the Mayfair Drawing Room series of lectures was delivered by Mr. Ernest Turner, F.R.I.B.A., on Thursday week, in the presence of H.R.H. the Princess Mary of Cambridge and a fashionable audience. The lecturer treated the subject, "The Ideal Dwelling-house," from a hygienic point of view, and gave many examples, illustrated by diagrams, of sanitary defects too commonly found. A point of much interest was a description of a method of ascertaining, without taking up the flooring, whether drains under houses were leaky. The simplest method of excluding sewer air from dwelling-houses without recourse to expensive patents was also described. After calling attention to statistics proving the importance of the subject, and its bearing upon the well-being of the community, practical suggestions were made with regard to the improvement of the drainage, water supply, warming and lighting of existing houses. Referring to ventilation, numerous means were constantly being introduced for admitting cold air, but the admission of warm fresh air was too much neglected, and the advantages to be derived from ventilating grates were forcibly pointed out. A simple method of preventing water from freezing in cisterns, by means of a branch from the expansion pipe of the hot-water cistern, was shown. The dangers to health arising from dust-bins were alluded to, and the system, or rather want of system, of collecting dust in London, was strongly condemned. Mr. Turner insisted that the most rational and economical means was house to house collection, and commented on the improper construction of dust-bins, their unnecessary size, and the unsuitability of the materials used in their construction. Householders were much to blame, as much vegetable and other refuse that ought to be dried and burnt was thrown into the dust-bin. The National Health Society propose organising a series of lectures to working plumbers. Suggestions should be sent to the Secretary, 41, Berners-street, London, W.

At a meeting of the Society of Engineers, held on April 7, a paper was read by Mr. Charles E. Hall, on "Modern Machinery for Preparing Macadam for Roads." After introducing the subject generally, the author proceeded to describe the various machines in use in some of the leading quarries and other works in the United Kingdom. The machines were illustrated by diagrams, and in describing them the author commenced with the original Blake Stone Breaker, which was intro-

duced into this country in 1862, and he followed the successive developments down to the present year. The author confined himself to those machines which had been practically successful, and which include Blake's improved, Archer's original, Orland Maddison's, Smith and Roberts', Maddison's, Marsden's, Archer's latest, Hope's, and Hall's "Multiple Action" Machines. The points of excellence and difference were explained by the author, who defined the requirements of a machine necessary for the production of perfectly cubical machine-broken stone for road purposes. Particular attention was called to the importance of dealing with stone in large quantities by an improved disposition of the various machines, in order to secure a better form of metal, with less waste than as usual under the ordinary working conditions, and reference was made to those works where the plan had been more or less closely followed. The development of various expedients for cubing the stone was noticed, and the results (so far as they could be arrived at) given of the working of each. The author stated that he was unable to fix definitely the cost of producing macadam by machinery, which should be true in all cases, as circumstances tended very greatly to modify it. He found from authentic sources that the cost ranged from 25 to 100 per cent. in favour of machine-broken as against hand-broken macadam.

MISS ELIZA METEYARD, author of "Life of Wedgwood," and many other works, died at her residence in Lambeth on Friday last. She was the only daughter of Mr. Meteyard, a surgeon, of Shrewsbury, and she was born early in the present century. Her first work was published in 1845. Miss Meteyard contributed a leading article to the first number of Douglas Jerrold's newspaper, and Jerrold himself appended to that article the signature of "Silverpen," under which *nom de plume* Miss Meteyard contributed extensively to several Metropolitan newspapers and magazines. Miss Meteyard's *magnum opus* was undoubtedly her "Life of Josiah Wedgwood," in which she embodied the results of many years' intelligent and painstaking research, carried on with an absorbing enthusiasm for all that related to the great potter. Her literary labours were recognised by Mr. Gladstone, upon whose advice she was awarded a pension of £60, which was after increased to £100 per annum. Dean Stanley also, in a manner worthy of himself, placed at her disposal the cottage in which she has resided for the last two years.

A COMMITTEE has been formed for the erection of a memorial statue to William Tyndale on the Thames Embankment in London, where a site has been granted by the Metropolitan Board of Works. The committee for this memorial proposes to raise the money in all parts of the British Isles. The total expense will be from £3,000 to £4,000. As it is wished to spread the interest of the scheme over as wide an area as possible, contributions of any amount will be welcomed. The Archbishop of Canterbury, the Lord Chancellor, the Earl of Shaftesbury, the Duke of Westminster, and others, have joined the general committee. An executive committee has been formed to conduct the work, and the Hon. and Rev. W. H. Fremantle, Rector of St. Mary's, Bryanston-square, and Mr. John MacGregor will act as honorary secretaries. The bankers are Messrs. Glyn, Mills, Currie & Co., 67, Lombard-street, E.C. We trust the result may be something more worthy of the site and subject than we have obtained hitherto.

A NEW method of copying drawings, which is said to be useful when a couple of dozen copies or so are wanted, has been brought out in Paris. The apparatus consists of a shallow zinc tray, in which is contained a smooth, jelly-like, cream-coloured substance, resembling in some degree partially solidified flour-paste. The drawing to be copied is made with a special ink. As soon as it is dry it is turned face downwards on the contents of the tray. The back of the drawing is then rubbed over with the hand. The sheet is then lifted up, leaving much of the ink transferred to the substance in the tray. A sheet of clean paper now takes the place of the drawing, and by rubbing it over gently with the hand, an accurate copy of the original is obtained. With care, as many as 100 copies can be had. When all that are needed have been taken, the composition in the tray is washed with a damp sponge, and is then ready for use again. The nature of the composition has not been made public.

With the sanction of the trustees of the British Museum, and under the auspices of the Society of Biblical Archaeology, Mr. Stephen Thompson, who has lately returned from a professional expedition to Cyprus, is about to reproduce the bronze ornaments of the palace gates from Balawat, near Nimroud, in the exact size and colour of the originals, by means of the autotype permanent process. It is proposed to issue with the *fac-simile* plates letterpress descriptions by Mr. T. G. Pinches, the whole work of reproduction being under the superintendence of Dr. S. Birch, keeper of the Oriental Department of the British Museum. The entire publication will consist of about 90 large plates.

THE Spring Exhibition of Water Colours by living artists, at the Royal Pavilion Gallery, Brighton, opens to-day, and contains several pictures by well-known and local artists. We observe the names of A. MacCallum, A. F. Grace, Edwin Hayes, A. W. Bayes, D. Law, Harry Hine, Clem Lambert, R. H. Nibbs, O. B. Lomax, R. Cooper, Jules Lessore, Barraud, Bayliss, W. Cruickshank, B. E. Ward, P. F. Poole, R.A., R. Meyerheim, Spiers, Mearthur, G. L. Beetholme, Haylar, Cox, and several others, many of whose works have on previous occasions enriched the walls. Landscape, still life and fruit, form the staple subjects of the present exhibition. Coast scenery in Devonshire, Cornwall, Sussex, &c., appears to present a never-failing source for the artist's pencil. Thus we have some studies near Hastings by R. Beavis, Clara Montalba, and Charles Collins; sketches of the South Coast, &c. Shoreham seems a favoured place for artists of scenery of this kind, and the Harbour is a favourite theme. Bramber, Hurstpierpoint, East Grinstead, are all capital places for the study of colour and picturesque effects. We notice several architectural sketches, among them "Long Parish Church, Hants," by O'Brien Lomax; "Rochester Cathedral," by G. de Paris; "Near Arundel," by W. H. Mason; "View of Chichester Cathedral," by Clara H. Warne; "Church Porch, South Hayling," by E. Evans; "Bridge-street, Chester," by A. B. Donaldson; "Grand Canal, Venice," by J. Lessore; "St. Mark's, Venice," by the same; "Kenilworth Castle," by C. Marshall; "A Roman Triumphal Arch," by J. M. Donne; "Capella di Santa Fina St. Gemigneani," by M. S. Wratlaw; also Nos. 94, 102, 115, 339, 566, 593, 546, 507, 356, 215, 520, and last, though not least, Mr. W. Bayliss's "The Lily of France—La Sainte Chapelle."

NOUMEITE is a stone of much beauty, capable of being used for many of the ornamental purposes to which malachite, serpentine, and verd-antique are applied. It does not possess sufficient homogeneity to entitle it to the name of mineral, and although it contains a heavy metal and can be employed for its preparation, the name of ore does not sufficiently describe it; neither can we properly call it a rock, as its constituents are too few and familiar. Briefly described, it is a massive form of *garnierite*, or hydrated silicate of nickel and magnesia. It comes from New Caledonia, and was discovered

a few years since by F. Garnier, whence the later name. The former name *noumeite* is derived from that of the principal town of New Caledonia, Noumea, which has since been changed, however, to Port de France. At the recent World's Fair in Paris this substance was exhibited in large quantities, and we learn that it has already become an article of great importance to the nickel industry of France.

THE REV. CHARLES H. MIDDLETON has replied in pamphlet form (Spottiswoode and Co. publishers) to a letter published by Mr. F. Seymour Haden, F.R.C.S., under the title of "The Etched Work of Rembrandt." Mr. Haden charged Mr. Middleton with having appropriated his views and his chronological arrangement, and declared that, apart from those appropriations, Mr. Middleton's publications are worthless. In this reply Mr. Middleton repudiates the accusations in vigorous terms as unjust and untrue. He explains the footing upon which he became a member of the Burlington Fine Arts Club, to the members of which the "Reply" is primarily addressed, shows the origin and character of his work in connection with the proposed Rembrandt Exhibition at the Club, and quotes passages from letters addressed to a contemporary, referring to their dates as establishing his innocence of the charge of plagiarism. No point of permanent importance to the outside public is debated. The controversy is indeed essentially a personal one, and seems to be conducted on either side with an acerbity and warmth of feeling which may give piquancy to the discussion to those who have followed its details, but will impart to it little interest to the uninitiated in cataloguing intricacies and amenities.

SERIOUS damage has happened to the dock at the port of Silloth, on the Cumberland coast of the Solway. About four o'clock on Sunday afternoon the wall on the west side of the entrance to the dock gave way. One of the dock gates fell, and the water, which at the time was standing about 21ft. deep in the dock, rushed out with great force, carrying away about 20 yards of the west pierhead, which, having been stripped of its protecting masonry, offered but little resistance to the current. The west gate, in its fall, knocked the east gate out of its proper position, but it is still standing in a dilapidated state, and the wall on the east side of the entrance appears to be in a somewhat critical condition. The large blocks of masonry of which the west wall was composed having fallen into the entrance to the dock, a complete stop has been placed upon navigation. The cause of the disaster has not yet been definitely ascertained, but the general surmise is that the sill of the dock, owing to some gradually increasing defect, had burst up, and the water thus gaining access to the foundation of the wall got behind it, and bulged it in. It will cost between £20,000 and £30,000 to repair the damage.

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CHIPS.

The restoration of Bexhill Church, Sussex, is progressing rapidly. The church has been cleared of old fittings, which are to be replaced by open benches and other suitable furniture; the walls are being repainted and replastered, and the roofs entirely retiled, while the tower is being partially rebuilt.

Mr. John Pagan, C.E., who has for the past four years been Borough Surveyor of Wakefield, has been appointed Colonial Surveyor and head of the Public Works Department in the Colony of the Gold Coast, at a salary of £800 a year.

At a special meeting of the trustees of the Lower Ouse (Sussex) Navigation, held at Lewes, on Monday, it was decided to erect a new iron bridge over the river at Southease, in accordance with plans submitted by the engineer, Mr. Wallis, of Westminster. The cost is not to exceed the estimate of £2,252 17s., the actual tender of a firm in Staffordshire, and the bridge is to bear the weight of traction engines up to 20 tons.

The corporation of the decayed Cinque Port of Pevensy have instructed the town surveyor to stake out land, preparatory to entering upon a building scheme, in the hamlet of Wallsend, which it is hoped will be ultimately joined by roads and houses to Eastbourne.

A new steam laundry has been opened at Dorchester. The buildings have been constructed from the designs of Mr. Gregory, of that town.

New offices for the Guardians of the Portsea Island Union are about to be erected at Portsmouth, at an outlay of £5,575.

Mr. W. Logsdail, of Lincoln, has carried off the first prize in the School of Fine Arts at Antwerp, the leading academy for painters in Europe. The school is frequented by many English students, but the prize, it is stated, has never before been carried off by an Englishman.

A Methodist New Connexion chapel, at Bistre, North Wales, is approaching completion. Mr. R. Owen, of Breck-road, Liverpool, is the architect, and Mr. John Williams, of Buckley, the contractor. The chapel will seat 300 people.

A stained-glass window has been placed in the east end of the north aisle of Blofield Church, Norfolk. The window is of the Perpendicular period, and of three lights; these are filled with life-size figures of the Saviour, Moses, and Elias. The tracery is filled with angels playing musical instruments, including the harp, organ, violin, trumpet, &c. The work was executed by Messrs. J. and J. King, of Norwich.

At the meeting of the restoration committee for the Church of St. Peter Mancroft, Norwich, it was unanimously agreed to consult Mr. George Edmund Street, R.A., as architect, and to request him to report as to the extent of restoration necessary, and what portions of the fabric require immediate attention.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 18, 1879.

THE FINE ARTS AND OPTICS.

THE relations between these arts and this science, and of this science, indeed, with architecture also, are not sufficiently studied. Nothing, however, can be more obvious than the influence of light and vision upon all objects whatever, natural or artificial. That which, in semi-darkness, is only a sketch, becomes in full day a distinct outline; and, of course, not tints and shadows merely, but colour in its every variation, depend absolutely upon the medium through which they are viewed. Dimensions, form, and so forth are acted upon greatly through this element, which largely accounts, therefore, for the effect of different architectural styles in different climates. The study of light, indeed, is essential to much of human knowledge—to astronomy and mathematics, for example—but in no realm is it more essential than in association with the Arts, and painting especially. The two, in fact, are kindred, or rather the one owes its birth to the other. It is this which produces foregrounds, middle-distances, and backgrounds, solid and aerial perspectives, gradations of hue in landscape, modulations of beauty in the human form; it governs the blending of pigments and the distribution of shadows, and yet no two vocations are more opposite, more widely sundered, more in contrast, as pure mechanics must be in comparison with pure fancy, than those of the artist and the optician. But the results of their studies are in a considerable degree the same—that is, when due thought is thrown into either, although it has been frequently the case that an artist has produced effects of light which have perplexed an optician, while an optician has laid down laws of light unintelligible to an artist—the one, as it were, speaking poetry, and the other algebra; the first creating harmony out of an unknown law, the second constructing a law out of an unappreciated harmony. We have to do with the former rather than with the latter. When Raffaele painted "The Holy Family," Correggio the "Marriage of Saint Katherine," and Murillo his Virgins surrounded by angels, and enveloped in a mystical radiance, these men were engaged upon works of science scarcely less than of art; they brought its realities to the aid of their imagination, and a similar remark applies to the canvases of all the painters who were poets, without being imitators, and who worked at their best, whether it was Sanzio in the porch of a Roman temple, or Drolling in a Dutch kitchen. Granet used to close his shutters at noon, and labour by the illumination of an oil lamp; and "single-candle" Schenckel's name is a by-word in the studios of Europe. Those Low Country artists, indeed, often subordinated everything, the human figure itself included, to the producing of variation in light and shade. For this they degraded their subjects; for this they introduced every species of eccentricity; they preferred a sun's ray, falling through a barn-door on a heap of yellow corn, to an Italian glimpse of blue sky and golden-winged angels. Where should we be (was an old question among artists) if the distribution and power of light were equal everywhere? There would certainly be no Italian, and there would be no Flemish schools, for Venice and Naples are not less necessary to the one than Amsterdam and the Zuyder Zee are to the other. The element—to call it one—is not only poured

upon almost every object in nature; it is reflected from and refracted by it; and every hill and tree, house and rock, man or animal, possesses an individual illumination. Thus, the Germans. But it is not requisite to accept all their abstractions on the subject. The simplest ab-initial knowledge tells us that, without light, coal would not be black, the sky blue, a rose red, or a diamond sparkling. These are the earliest teachings of optics; and when art takes up the tale, it is at the point where lights and shadows, colours and dead surfaces, have to be adapted or combined, contrasted or compared. The Greek painters, of whose works so few are left, knew that the strongest glow of yellow, blue, or green, thrown upon a deep red, would darken instead of lightening it; they never, therefore, put these colours into juxtaposition; they challenged crimson with white, and found it unconquerable; but when they threw upon either a flood of perfect, untinted light, coming, whether artificial or not, from the natural direction of the sun, they never found the experiment to fail. In later days, Newton, conversing with an artist, spoke of their discrimination as of an instinct. But, although the artist, in search of a medium through which to paint, may elect between the humid verdure of Ireland, the mist-crowned Scottish mountains, the transparencies of the English Lake atmosphere, or the thousand-and-one illusions of air and colour on the Continent, in America, or in the East, he must expect endless fluctuations, from hour to hour, from moment to moment, even on one and the same spot. No landscape is ever the same for an instant together. Photography can do nothing with nature. It may outline a form, human or other, or a ruin, or an horizon; it can suggest where the lights and the shadows lie, but what shadows and what lights it cannot tell, while, with reference to the beauty of a rainbow, or a sunset, a sea, a flower, or an altar-piece, it is dumb altogether. It can no more represent these than it can emulate the human eye.

It is a well-acknowledged fact that pictures change according to the light in which they are looked at. There is a subtle, and yet an easily distinguishable difference between them when viewed with the assistance of gas or lamps, and in the open air. The medium, even of a gallery at noon, is not exactly like that, for instance of a garden terrace, at the same hour. And the painter's work itself varies in an equal degree under the varying influences of the lights and shades to which his palette and easel are exposed. It is not difficult to understand, then, the characteristics of canvases such as those of Salvator Rosa and Rembrandt, of Van Huysum and Wouvermans, of Claude Lorraine and Canaletti. One glance at, one remembrance of their works, will suggest how much they were indebted to, how much they were governed by, their climate—which is only another word for the light in which they laboured. It would have been as impossible for Claude to paint his visionary paradise among the swamps of Holland, as for Greuze to have found his ideals in a Hindoo zenana. Slave as he is, therefore, of the light, the artist rarely pauses to reflect what may be the effect upon the eye, in England, of a picture painted, say, at Florence or Rome, at Munich, or in Calcutta. Nevertheless, it is sure to be materially different from that which he intends, and a surprise, perhaps, even to himself. He cannot carry with him the atmosphere of his studio, and this, perhaps, it was which induced sundry of the old masters to paint invariably by lamp-light. This enabled them, they said, to soften all their tints and shades, to paint independently of climate, and to level down their surfaces, so to speak, so that they might be violently inharmonious nowhere.

But these men did not derive their ideas from their darkened studios; they had seen Nature, of whatever kind, abroad, and the sun and the sky and the bloom of the earth were in their eyes, no matter whether or not they had drawn their curtains before sitting down, palette and brush in hand. The artist, then, who works on any noble scale, seeks, with the sole assistance of his eye, representing his mind, to distribute lights and shadows, in proportionate masses on his canvas, striving to preserve their due relations, and to keep them in harmony with whatever groups or figures may constitute the living interest of his picture—the details, matters in themselves, which are to be paramount above the whole. The optician studies also these grand effects; but he can bring machinery to his aid; he can multiply his own natural powers; he can measure, and even weigh, the light he wants to use; he employs, in fact, an apparatus which, in these and latter days, physicians have found inevitable, and which, in time to come, perhaps artists may not despise. The Photometre, indeed, has already found its way into some of the German studios; but many painters fear lest its application should conduce to a system of mechanical accuracy in art, entirely incompatible with the free range of invention and fancy. It is like, they say, compelling Nature to pose through an opera-glass. Undoubtedly, such a medium is apt to throw up false lights and false shadows equally, of whatever shape and colour the object may be, yellow or blue, a house, a cart, or a garden wall. Then, is an artist to copy, without calculating, or is he to summon to his assistance, a more than a pre-Raphaelite—a scientific precision, as to matters of fact? For that is really the question. A French critic has put it to the test. He brought his apparatus near to where an artist sat, painting a yellow wall; he fixed his photometer so as to take in the object; after the work was done he fixed it in like manner upon the picture. The result was, he says, the triumph of a test which few pictures could undergo, with the discomfiture of the painter. Two errors, we are assured on the same authority, interfere with the proper concentration and dispersion of light on canvas, the one a timidity in the deepening of shadows, the other a too great freedom in the employment of pure yellows, and when these have to be modified the more sombre ochres, often bastardised by other and, in themselves, corrupted pigments. With these, of course, light can never be equal, or the tone harmonious, though the colour produced may appear fascinating enough at a superficial glance; but in these instances—and here is a profound mistake which the great old masters never committed—the light is not consonant with the shadow; in other words, the artist was not possessed of the optical science or instinct. For in every work of fine art the lights and the shadows, analysed, will be found consistent, and the one belonging naturally to the other. The same ray from the sun, penetrating the same medium, produces both, and a summer shadow in Rome is no more like a winter shadow in St. Petersburg than the leaning tower of Pisa is like the porcelain tower of Pekin. Modern landscape painters, it is true, have observed upon this fact, and endeavoured to profit by it. Decamps, for example, is geometrically exact in his distribution of the sun's rays at particular hours of the day, and even in different latitudes. What, it may be asked, is the influence of this exactitude upon the mere connoisseur? It creates a sense of the real, it tends towards an education in art; in fact, the farther we leave the ordinary pastures of home and approach the East—Egypt, for instance—it becomes an essential. An Egyptian landscape is all colour and light, so is an Egyptian ruin; a sunless Cairo would be, on canvas, the merest heap of dilapi-

dation. Moreover, painters of night scenes have felt the difficulty in its full force. Generally, like that marvellous Schenel of whom mention has been made, they place a flaring lamp in the middle of their canvas; they surround it with an obscure interior, or the confusion of a crowded market-place; they either throw its beams upon common objects, intensely illuminated, or lose them among the shadows beyond. M. Jules Janin, analysing these effects, found that the lamp in the picture gave forth fourteen out of fifteen times less than the light that was actually due from it. This, of course, was an arbitrary conclusion, derived from, as it were, an imaginative experiment, but it brought Science, in a way, to the door of Art, and the two did not agree. Granet, already spoken of, was a master of the art of illusion produced by these mere contrasts of darkness and light. "M. Granet," said the Eighteenth Louis, "I am always afraid to look at one of your Capuchins taking snuff, lest he should sneeze in my face"; a profound compliment to the artist, but an utter repudiation of colour; for these pictures were all of vaulted, cloistered halls, subterranean passages, grated windows, and sombre staircases, with a single beam of light, and no more, introduced somewhere. The truthfulness of this artist, therefore, says his critic, is not less an illusion than the illusion he was so fond of attempting to produce. More than this, however. The precision aimed at by these elaborate methods is often not obtained. A sky full of clouds will appear sometimes of a dead white when scanned by means of the photometer; a false dazzle, too, is occasionally created, even by the most perfectly-adjusted instruments, and the finest judge, the most infallible reflector is, after all, notwithstanding its eccentricities, the human eye, than which, assuredly, no mechanical optical arrangements can be better adapted to compass whatever there is of colour or outline in art or nature. The reproduction of colour, as already said, is beyond the reach or hope of any mechanism, and, as to outline, the more largely it is extended, by whatever copyist machine may be employed, the more it becomes blurred and indistinct. Art has been made, in its inferior degrees, very much an affair of optics in recent years; but optics, as applied to the higher and finer arts, appear to have been scarcely worth a thought.

THE IPSWICH POST-OFFICE COMPETITION.

THE Ipswich Corn Exchange is to give place to a new Post-office, combined with Corporation offices, and the provision of a new Corn Exchange is contemplated by the extension of the public hall in Westgate-street, while designs for a school of art and museum have just been invited. Twenty-two designs have been sent in for the first-mentioned project, now on view at the Town-hall. The Corporation in their printed instructions imposed certain conditions as to plan and style, which really left competing architects little or no liberty, and the result is a set of drawings that display an unusual want of originality or invention. The site of the present Corn Exchange was given, and as the area was confined by the existing walls of that building there was no opportunity for artistic skill in the grouping of parts, or play breaks or recessions in the line of the façades which an architect is naturally prone to indulge in. Furthermore, the competitors were bound to a certain internal arrangement for the Post-office prepared by the borough surveyor, who also suggested a scheme of subdivision for the public offices, and, in short, they had simply the task before them of supplying a set of façades in a given style for the four front-

ages. The town-hall adjoining the site, but separated by King-street, a by-no-means unimportant structure, in a freely treated species of Italian, moreover supplied the keynote for the composition of the new building, which was required to be "Classic." A set feature, or rather cast of expression, was given by another suggestion that a portico entrance of certain projection should be shown on the chief or Cornhill front. It would be expecting too much under these restrictions to look for any great amount of architectural skill, much less of variety, in the treatment, and we have accordingly a set of designs ranging from Classic models to free Italian or Renaissance. In the larger number of designs, the model plan as regards the distribution of the windows has been scrupulously adhered to, notwithstanding considerable architectural variety would have been attained by a free redivision of them. The value of pronouncing the public offices towards King-street especially has been neglected in some cases; while the canted corners shown in the regulation plan, always very difficult problem in Classic design, have not, except in one or two instances, been cleverly managed. We may here suggest another departure from the plan that would be a great public convenience. Most of the designs show the postal boxes below the portico reached by a flight of steps, the inconvenience of which might have been avoided by utilising a part of the public office near the King-street angle for the receptacles, and by introducing boxes below or in the window-openings, as observed in many of the metropolitan post-offices. An easier and readier mode of communication between the public and sorting offices might have thus been effected.

Proceeding to notice the designs in detail, we commence with "Well Considered," because we understand it has been favourably entertained by the committee. In plan we notice little or no departure from the model scheme. The floor of the Post-Office is raised about 3ft. above the Cornhill level, and the façade facing this open space is adorned by a rusticated basement, a portico of coupled columns, and with pilasters between windows above. These have semicircular heads filled with sculptured tympana, while the pedestals above the portico have groups of sculpture, representing the Arts and Sciences, certainly an unnecessary and costly addition, scarcely appropriate to the building, though not included in the author's estimate. The angle windows do not rank agreeably with those of the façade and flank, and their omission or reduction in width would have been an improvement. The clock-pediment over the centre, and the terminals are useless, and certainly unmeaning features. In the return façade towards King-street, the public offices are pronounced by a pediment. The style chosen is Classic of a Greco-Roman type, broadly treated in parts, and the design is illustrated by a bold pencil perspective.

"Dum Spiro Spero," shown by an ink perspective, is designed in a more commonplace type of Italian; it has pilasters at angles, the centre ordnance over Ionic portico is carried through the pediment in a not very elegant manner. As in many other cases, the author proposes stone from Bradford for the principal front, combined with white Suffolk bricks. As a Classical composition, "Mercury" ranks high in merit. In the perspective drawing we recognise a well-known hand. The Cornhill front is in a broad astylar treatment, Florentine in feeling, without a pediment, a bold modillion cornice of some projection crowning the building, and a low wide portico of Roman Doric, with coupled columns before the entrance. The angles are left canted, but the windows in them, unlike those in "Well Considered," are narrow. The lines and

fenestration of the façades are almost academic in severity, but elegant; the architrave mouldings continue to the cornice, and enclose above the heads of windows some carved relief. Steps between the pedestals of the columns give access to the portico, but here, as in most instances, the necessities of a public post-office have been lost sight of. The building is conceived too much in a villa or club-house style, and whatever merit it has in the chief façade is sacrificed to the exceedingly meagre and common-place treatment of the façades facing the Town Hall and old Herb Market. Nothing could be more pinched or starved in effect than these fronts, and the author appears to have lost all interest in his design immediately he turned the corner, in spite of the fact that the King-street front will be seen quite as much as the Cornhill façade. The Corporation offices are separated by a slight recess in the wall at the corridor entrance. The materials proposed are ashlar, or white brick facings. We note rather useless accessories in the shape of sculptured arms above the angle windows. The author's estimate is £6,081.

"Effect and Economy" is a large pencil perspective in a free Italian dress, with portico and pedimented treatment of front, over a rusticated basement. The upper story is enriched by panelled pilasters and pedimental-headed windows, in a style that rather competes with the town hall, and economy does not appear to be the leading recommendation. In the return front the public offices are not well managed, the horizontal members and string-courses being cut through by the lower windows. In the plan the author shows a few deviations; the school board-room, 20ft. 6in. by 25ft. 6in., is not placed in the centre, but at the King-street end of the range of offices, and on the second floor the principal office is above it. We think this an improvement. In the space in centre of basement, under post-office, the author suggests that 8 strong-rooms should be erected for the use of the public offices, and for letting.

"V. R." is a striking design illustrated by a large ink perspective drawing. The style is Italian freely treated, with pilasters. There is a Doric portico, the public offices being emphasised by a different treatment of windows, and a break in the lines of composition over the public offices entrance. A level roof as in most other cases is shown. The stairs are altered from the centre of public offices, as in the Corporation's plan, to the end of corridor, which is a better position. The figure of Britannia on the façade would have been wisely omitted, and if instead of a clock over the portico, common to many designs, an anemometer were substituted, an instrument of some utility would be added to the town, while a clock might be placed in the King-street angle of the building, and it is surprising this better seen position has not been selected. The canted corner by the way offered a capital position for a clock, which might have been placed between the stories or at the summit under a pediment. Being in the instrument room, the position would be a desirable one.

A design noticed with some favour by local critics is "Sivez Moi." The author's design, though rich, is not redundant in pilasters or carving. A breadth of effect is obtained, and if it lacks anything it is in refinement of detail. The style is Italian, broken in the cornices with circular corners, and angle pilasters. There is a centre panel with Royal arms over the façade. We dislike the iron cresting to roof—a rather vulgar source of effect. The author, sensible of the lowliness of the sum to be expended, estimates the Post-office at £4,194, and the Corporation offices at £2,369, the cubic contents of the former being calculated at 167,758ft. The author, in not very good taste, puts in a plea for acceptance on the ground of his

being a native of Suffolk, and having received his education in Ipswich. Such a practice is to be reprehended in competition as unfair to others. In the design "Despatch" (in red), which is, we believe, by a local architect, we are struck by a simplicity of treatment in spite of the obvious violation of some conventional proprieties of the style. The drawings are feelingly rendered in a style that may be called Palladian, though inexpensive in the material proposed, and not lavish in carving. We might find fault with the rather purposeless pilasters between windows and some other inaccuracies of composition. The offices are unemphasised. In an amended plan, the author shows the sorting-office along the King-street front, the sorting-table by this means communicating with the letter-box; and the doors, area, three w.c.'s, are shifted a little in position. A stone basement, with white Suffolk facings above, are proposed. Very unlike, and in rather "grandiose" Italian, is an elaborate set of drawings with a Postage-Stamp for motto. The style is Italian or Roman of one order, with pilasters at the angles in pairs, a pediment over portico, the latter arched between the piers. Pediments are placed in the centre of each front, and no difference of treatment is attempted in the offices portion. The elevations are carefully drawn. Our previous remarks upon the position of a clock in the main façade apply to this design. White bricks are proposed for the back elevations, with stone ashlar for the Cornhill front. The style adopted is expensive and rather ambitious, and the building is seriously estimated to cost £5,950; another thousand would be nearer the mark. "Civis Non Peregrinus" sends three designs: the first, shown by a neat perspective, is the best, and is conceived in an Italian spirit. The old portico is retained and carried up to the top of the building by another superimposed order, crowned by a pediment, a plan that certainly gives solidity and dignity, if it is a costly feature. The angle pilasters do not break at the angles. We like less the design marked "B," where the pilasters are placed in a wrong position, and the details are poor; a third, "C," is crowned by a heavy pedimental tablet with the inscription "Post-office," perhaps quite as desirable as a clock in a town like Ipswich, frequented by strangers. The parapets are undesirable features, and are certainly costly and troublesome. The author cubes his building at 140,350ft. for post-office, and at 94,000ft. for the municipal offices, making a total of £6,056.

A few other designs call for notice, though of less merit than the above. "Harmony," half-shaded in colour, is an Italian composition, with pediments on each front, a circular arched portico, rounded corners, and commonplace detail. The estimated cost is £7,000; "Animo et Fide" is tawdry in treatment, and redundant with worn-out and expensive features, such as a domical hip roof and a cupola. On the whole, it looks like a miniature copy of the Town Hall. "Despatch," which we distinguish as No. 2, shows a rather weak composition, particularly at the sides; the window pediments are costly features, and would necessitate stone. The elevations in outline are not accompanied, apparently, by any other drawings. "Ipswich Arms" is hard and meagre. "Post Officia Fortuna" shows a pediment brought out over the portico with pedimented corners. "Faith" is grotesque, and crowned by a cupola, deeply undercut at the base, and toy-like in character. "Corona" is an olla podrida of Italian. "Courage" lacks the public character, while "Red Star" is an exceedingly ponderous design, with excessively heavy corbelled window heads, and no relief whatever.

On the whole, it must be confessed that there is no one design that can be carried out effectively for the sum intended to be

spent, and we may add our opinion that a sum of £6,000 is totally inadequate for the erection of a building of the dimensions required, and in a style worthy of association with the Town Hall. As it is, we find the estimates vary from £5,600 to £13,000; while, if we examine the cubing, we note an unaccountable and astonishing difference made for a building of predetermined dimensions, the figures ranging from 200,000 to 400,000 cubic feet. We have roughly cubed the two portions of the building, and find the cubing of both come to about 300,000ft., or a trifle less. The rate per foot cube also exhibits an equal disparity, some competitors pricing at 6d. and others at 9d., the average appearing to be 6½d. for the municipal offices, and 7½d. for the Post-office. Judging from the character of the designs, many of them must have been cubed at even a less figure than 6d., if the matter was considered at all, which is certainly doubtful. Under such circumstances, we strongly recommend the Corporation to obtain professional advice, as regards cost, at least, before coming to a final decision. In regard to the style, something essentially plainer and of greater solidity of character than the Town Hall is required. There should be nothing in the post-office front to suggest comparison, or compete with the more important municipal structure by the side of it—nothing exaggerated, pretentious, or grotesque in feature or style. The Cornhill front ought undoubtedly to have a portico of spacious width, such as many of the designs show, of Classical proportions, quiet, and very moderate in enrichment; the façade should be united to the portico by the dominant lines of cornice or entablature, and the whole front should be symmetrical and balanced, deriving its chief architectural expression from the fenestral arrangement and cornice, which ought to be open and indicative of purpose. If a pediment be attempted it should certainly be moderate and retiring, not crowded up with sculpture or terminals, that would immediately vie with those of the town hall. The façade facing the latter ought certainly to be treated as one elevation with the front, and if possible we think the additional stories of the municipal offices support the principle that they should be pronounced instead of appearing to be incorporated under one roof. We think that the basement should be of stone rusticated, and we favour those designs which have no pilasters, or deal sparingly with them. The Cornhill is the most conspicuous site in Ipswich, and it would be an irretrievable mistake for the Corporation to commit themselves to any design that either lacks architectural character or is shorn of the best features it has, or to meagre proportions by a process of cutting down afterwards.

BUILDING MACHINERY.

ALMOST within the limits of the present generation the old-fashioned "builder" has developed into the modern "contractor"—an employer of countless "hands," who in lieu of the "yard" of former times, has his wharf on the river; his steam saw-mills, his brick-fields, and, perchance, his quarries; who imports his own timber, and burns his own lime, and not unfrequently covers his own freehold estates with houses, the ground-rents of which represent a satisfactory income calculated by the tens of thousands per annum. There is no need of examining how this altered condition of affairs came about; how from the plan still pursued in the provinces, wherein each trade is contracted for separately by masters in that particular branch, certain bold innovators came forward with proposals to take the entire job, and sub-contract with the tradesmen in each department; and how

ultimately these "general contractors" became the wealthy capitalists of our own day, and employed workmen of every kind, and not only supplied all the labour required in the execution of great works, but became, or are gradually becoming, providers of the varied materials used in building. We only glance at this matter in order to show that the contractor who has so far concentrated all the small fish into his net is in a first-rate position to avail himself to the full extent of every modern mechanical appliance for carrying out the extensive undertakings upon which he embarks, and for saving to the utmost that most costly of all items to the manufacturer, *human labour*. Of course, in his workshops, his mills, and his brick-fields he takes care to provide himself with the best of machine-tools, and, if his workmen do not combine to prevent him, he will be the first to obtain every new description of wood and stone-working machinery, and every similar appliance for preparing his materials. He is well aware of the pecuniary advantages to be gained by strict adherence to the maxim of the nineteenth century, "Never employ men to do what can be done as well, or better, by machinery," and for no one has the manufacturer of labour-saving machinery worked to greater advantage than for the builder. In all these respects his plant is little short of perfect; but when we get on to the scene of his building operations, the place where the materials so skilfully prepared have to be erected and placed in position, we find many anomalies, many signs of the prevalence of old-fashioned ideas, and much that seems scarcely in accord with the progress we have briefly alluded to in the other departments of his works. We propose to glance briefly at the different stages of the progress of an important work, and see where we have found antiquated modes of working to linger, and in what respect it appears possible to suggest improvements; in short, to sum up all that we find on a large and important works in London, in the way of mechanical aids to what we may term the erection of the building. We have a portable engine, of a type specially adapted for agriculturists; a clumsy and ill-designed mortar mill; a steam-pump, whose chief merit appears to be that it furnishes a standing job to the fitter to keep it in order; an overhead travelling crane; and sometimes a steam-hoist. Now, when we reckon up the numerous and intricate operations which are involved in the erection of a large building, this list, which is a more than usually complete one, leaves much to be desired. In small works we rarely find anything beyond the mortar-mill and the portable engine.

On turning to our advertisement pages we find many firms offering to the trade the most varied assortment of what we may call workshop plant; but the machinery specially adapted for the works seems to have attracted little notice among mechanical engineers, and it is to this class of building machinery we wish to call attention. On visiting a little while ago one of the largest works in progress abroad, upon which between 3,000 and 4,000 workmen were employed, we found that the united power of the engines (chiefly used in pumping and mortar-mixing) was under 100 horse-power, and that in scores of cases where a simple machine might have done the work of a dozen men no idea seemed to have entered the head of the employers that the work was being done wastefully. There can be no question that in this matter they are in France and Germany even more behindhand than we are. In France that most valuable appliance the light iron tramway, and the so-called contractor's engine was almost unknown until a year or two ago.

In our survey of the work, we may begin with the excavation, and here, though there is an ample field for improved modes of working, the navvy with his spade still holds

his own, and such a thing as a steam-excavator, though quite possible on a scale which could be profitably employed on the foundations even of an ordinary warehouse, is only introduced on the most extensive railways, docks, or canals, and has never, so far as we know, been constructed of a size suitable for the builder. Something of the nature of a revolving scoop, which could be advanced on a light framework similar to a drill, and would raise the earth as fast as it was removed, by means of an elevator, into the carts, would accomplish what we have in view, and do our digging far better and more quickly than a gang of men.

If we visit the site where they are preparing the foundation for a large building situated in a narrow street in the City, we cannot fail to be astonished at the straits to which the foreman is driven to provide a cart-road at an almost impossible angle to reach the lowest level, and the terrible strains to which the poor horses are subjected in dragging out the loaded carts. Failing the steam-navvy, with a self-delivery for the excavated materials, we would advocate the introduction of a simple form of hoist which could be very easily rigged up, and which could be used both to raise the barrows from the trenches, as well as subsequently to lift the bricks, the mortar, and the men to the different levels of the building; a jointed framework, which could be readily run up. An additional stage would be the most generally useful form. Within this frame should work a platform large enough for a wheelbarrow, or a small four-wheel truck. A wheelbarrow, by the bye, is mechanically a wholly obsolete contrivance, and ought years ago to have been sent to the old curiosity-shop. Now that iron is so cheap, a small tramway with a 2-feet gauge can be readily and quickly laid down, and light trucks made of wrought-iron, which would contain from 2cwt. to 3cwt. each, would enable a man to do three times the work he now does with a barrow. We might expect in Spain or in Russia to see men wheeling loads before them in such a way that they manage to carry nearly half the weight themselves; but in this year of grace 1879 it seems almost too ridiculous to see in London a long line of men toiling up ladders with hods upon their shoulders. Just consider what this involves—150lb. of flesh and blood climbing up a scaffold with 50lb. of materials! The cost of raising each ton ranging, at the present rate of wages, from 1s. to 1s. 6d., in accordance with the height of the building! The horse-lift is infinitely better than this, but a horse-run does not pay for anything under 25ft.—showing at a glance what a relatively expensive way even this must be of hoisting the materials. Relatively we mean to steam-power, which would do the work for 1d. per ton. What the London builder wants is a well considered 7 to 10 horse-power engine of the semi-portable type, with a grate arranged for burning coke. In connection with this he must have the means of driving a good 8ft. to 9ft. mortar mill—(the small mills are of no use) and if he can contrive to take some of his power, by means of shafting, to work a rocking sieve for sand-screening and a small band saw to save the time of the carpenters, so much the better. His engine will work the winding gear for the hoist, and before the mortar is wanted it will do all the excavation for him. Surely one of the many makers of portable engines could give us what is wanted, from this brief description of the work it would have to do. We have mentioned the sieve for screening and washing the sand; nothing could be easier than to do this work with a machine of the most simple kind. It is true that the cost of this does not form a very serious item, even in the largest buildings, and that it may not

pay to have a special band from the shafting to drive the sieves; but in the contractors' engine and fittings of the future, it might be as well to remember this. Next we come to the bricklaying; this cannot be done by machinery, and all the more reason for abolishing it entirely. Of all the antiquated methods of going out of our way to make work, the use of bricks is about the worst. Why, with all our boasted progress, we find ourselves at the end of the 19th century sticking together bad bricks with worse mortar, is wholly incomprehensible, and can only be explained by our desperate attachment to conservative principles.

With an excellent and reliable material like cement concrete we ought years and years ago to have found out a mode of facing it with some glazed impermeable surface, and trusted to walls made of concrete which are in every respect vastly superior to brickwork. We shall doubtless come to this; but probably not until it becomes something approaching felony to employ bricks. We have, we fear, after all, pointed out only very few of the unworkmanlike ways of building now in vogue. To name another clumsy, blundering plan, rendering our workmen liable to all manner of accidents, just look at our system of scaffolding with fixed poles and cords—how long will this muddling plan prevail, we wonder? Here there are signs of improvement, however, as an excellent invention has been recently introduced for using square timber for the uprights and ledgers, and employing shoes and rings made of galvanised iron. Something far better, and by no means difficult to arrange, would be a platform of light iron-work, raised 6in., say, at a time by hydraulic pressure or a simple rack and pinion. In scaffolding of this kind our French neighbours are very ingenious. Look where we will, however, over the entire works, we find everywhere a tendency to plod along in the old grooves, with an entire forgetfulness of the invention and progress which are the characteristics of the present day; and if by these criticisms, which are offered in no unfriendly spirit, we can succeed in directing attention to points capable of improvement, we shall not have failed in our object.

PARAPETS AND CORNICES.

THERE has been a return of late to roofs with gutters and parapets, but the practice has only been brought about by the change of fashion in architectural design, and not by any well-founded preference for a system of construction that must be more costly, and has always been associated with imperfect and worn-out systems of architecture. The crowning of the wall has always been one of the distinctive features in every style of ancient or modern times; and from the hollow, lotus-adorned cornice of the Egyptians to the best examples of Greek and Gothic, we find the cornice and parapet struggling for supremacy. With the Greek architects, the projecting members of the cornice formed the constructional drip protecting the wall below it, and allowing the rain to flow off the roof. The Doric cornice is now believed, with some show of reason, to have arisen from the necessities of timber construction, in which the cross timbers became at length transmuted into triglyphs, while the upper members formed the edge of the covering of slabs or tiles, as now used in the East. In the course of time this order of things was changed. The constructive motive was lost sight of, and the wall, and not the roof, became the object of attention. The Romans were the first people who made the walls of a building a mere mask to the internal structure, and this idea was never totally lost sight of, even by the Mediæval

builders, who built parapets to their church roofs both over the naves and aisles. The modern architect revived the idea of having roofs hidden, and at the time of the Greek mania very few houses were without parapets and concealed gutters. All at once the spirit of the dream was changed; the parapet was condemned as false, as encouraging flat roofs that never effectually kept the wet out, while it disguised everything in the shape of chimneys. During fifty years the anti-parapet fever remained unabated. It was thought heathenish to hide roofs and to surround buildings with balustrades and urns. Recently, however, this interdiction has ceased, and the Queen Anne revivalists have once more taken to the idea of building parapets round the tops of houses and public buildings. After all, there may be something in the notion that parapets answer a useful purpose in intercepting snowdrifts, broken tiles and slates, and in affording a protection to those engaged in repairs and cleaning. It must not be imagined that the question is a party one simply, for it so happens that there are numerous excellent examples of buildings, both classic and Gothic, where the overhanging roof and cornice are adopted. In the Italian Renaissance, the projecting eaves cornice was always made a most important source of effect. We may mention the Farnese, the Pitti, Pandolfini, and Strozzi palaces particularly, as illustrating the importance attached by the Italian revivalists to the cornice, as the only crowning member of buildings. If we turn to the English revivalists, and especially Inigo Jones, whose works are just now held in fresh esteem, we find the parapet omitted in several buildings. We may name Ambresbury, in Wiltshire, and many mansions erected by the disciples of the same master, where the cornice is made the actual springing of the roof. At Chelsea, in Cheyne-walk, and in nearly every old square and street in London—the courts of the Temple particularly, the cornice is made a highly ornamental feature. Many of the latter are in cut and rubbed brick, and have modillions or blocks, and will well repay the admirer of our old sixteenth or seventeenth century architecture by a visit. While, however, such excellent examples of pure detail abound on every side readily accessible, it is somewhat ludicrous to see the attempts of certain revivalists among us to “snatch a grace beyond the rules of art” by designing or copying cornices of a nondescript kind, and by erecting parapets of the proportion of a breast wall to a rampart. One of the most noticeable features in the old brick houses of the seventeenth and eighteenth centuries, is the singular charm of the brick or stone cornices under a green-slatted or red-tiled roof; but it is a rather perverse fact that few of our buildings that imitate with such tenacious-like closeness the accidental features of this style have exhibited the one source of effect which the seventeenth century architect made so much of.

On the utilitarian aspect of parapet or projecting eaves we need not here enlarge; but we may at once observe that both are useful expedients under certain conditions of building. The parapet is, without doubt, a useful adjunct to the roofs of large town buildings as a means of providing access to the roofs; on the other hand, it forms a lodgment for snow, and a source of dampness to the rooms below, unless the precaution is taken of introducing a damp-proof course immediately below the flashing of the gutter. Its utility as an outside passage or gutter becomes interfered with when dormers are constructed, unless these be brought out on the plane of façade; on the other hand, the projecting eaves become a protection to the walls, and give even greater sanction to dormers as an architectural relief. There is one kind of parapet

that combines the advantages of both modes of construction to a certain degree, and this is the balustraded or pierced parapet; but we have seldom seen any satisfactory examples of them.

BAD MORTAR AND ROTTEN WALLS.

LAST week we drew attention to a case—an example of hundreds in the suburbs of the metropolis that never come to light—in which a builder was summoned by the district surveyor for East Hackney for using improper mortar, the magistrate ordering the houses to be pulled down. In this instance the mortar produced by Mr. Gould, the surveyor, was nothing but dirt coloured by a little lime, a kind of material that is by no means an uncommon substitute for lime and sand in the suburbs of London. It so happens that the “jerry builder” who indulges in this pernicious system of work has a very plausible excuse ready whenever he is caught. In more than one case lately it has been contended that the dirty-looking stuff is a compound of burnt ballast in lieu of sand, and evidence to this effect was produced in the case before us by another surveyor called to support the defendant. It seems to have been satisfactorily proved, however, and in a most amusing manner, that the ballast in question was a lump of canal mud, and that it had never been subjected to the action of fire may well be believed. It may be necessary to draw attention to the fact that ashes and cinders are frequently used instead of sand in the preparation of mortar, and that in the suburbs especially there is a strong temptation to use these materials for sand. If we could be sure of burnt clay or ashes free from dirt and impurities being used, there would be no objection; but, unfortunately, these materials are too often a disguise to the quantity of old mortar and dust-heaps that are utilised. There is one difficulty we may point out in the detection of this dirty kind of mortar, and that is the quality of lime used, if any. Only one means can be adopted to discover the efficiency of such a compound, namely, the immersion of a dried piece in water. If it has really any of the pretended ingredients, such as ashes or burnt clay pure and dry, mixed with good stone lime, the lump of mortar will remain hard; but if otherwise, it will quickly decompose, and run into sludge. We caution all those who have misgivings to apply this test. Such material as burnt clay should invariably be reduced to a fine powder before being mixed with the lime. It is not, perhaps, generally known that there are ingredients which rather improve mortar if used instead of sand. We may briefly refer to some of these. Smiths’ ashes we have occasionally pointed out as adding materially to the strength of mortar, though they are chiefly used to impart a black or dark colour. The scorie from iron works, and the slag from furnaces, are employed with advantage when quite clean. Burnt clay is also used as a substitute. It is prepared by placing moist stiff clay over a coal and wood fire, and as the clay becomes burnt fresh layers of it with “breeze” or ashes are laid on. The clay should be thoroughly burnt. Besides these materials, crushed stone is often used. It appears from General Scott’s experiments, that Portland cement and sand of equal measures withstood 504lb. upon an area of 10in. before breaking; with a proportion of 1 to 2 a weight of 433lb.; with 1 to 3 of 303lb., of 1 to 4 of 420lb., the age of mortar being eleven days. The following are given by the same authority for mortar in brickwork built with ordinary London stock bricks:—

	Parts by measure.	Quicklime.	Sand.
Fat limes	1	3	
Feebly hydraulic limes ..	1	2½	
Hydraulic limes (Lias) ..	1	2	
Roman cement	1	1½	
Portland cement	1	5	
Scott’s	1	4	

For fat lime mortar, fine sand has been found objectionable, as it prevents the penetration which is necessary for setting. On the whole, we consider coarse angular sand makes the best mortar, an opinion that is confirmed by all the old and hard mortars we have ever examined. It is said that calcareous sands make stronger mortars than siliceous sands, though we think this rather doubtful, as in the case of building stones, those sandstones in which the ingredient is chiefly quartz united by a cementing medium of a carbonate of lime character, are found to resist atmospheric influences far better than when the grains are of carbonate of lime embedded in a siliceous cement. For damp situations, as cellars and basements, fat lime should be avoided, as it retains moisture; and when once it becomes dry mortar made with it decomposes, and falls into a friable dust. Half the miserably damp and insecure houses in the suburbs of London, which occasionally yield and give rise to coroner’s inquiries, are built of fat limes on account of their cheapness and ease of working; after they have been occupied for a short time, door and window frames begin to show signs of weakness, the mortar has no hold, and loose masses of dry sand whitened by the lime, fall out on the least disturbance. Who has not lost both temper and patience in driving a nail into walls built of such friable material? If one attempts to draw a nail a puff of white dust is produced, and the mortar seems to have entirely lost its cohesive power and to have become so much sand. Mortar, with fat lime used externally, is still worse: it imbibes moisture with great avidity, and the first frost breaks away the outer crust. Pointing is the only remedy to prevent a further attack on the stability of the wall. We are glad to see that the amendments to the Metropolitan Building Act have not overlooked the subject of sand and lime in the mortar to be used, though we yet wonder how the provisions are to be effectually enforced in some cases. For buildings of ordinary kind limes of a slightly hydraulic character are required, such as grey chalk lime, called generally “stone lime” in specifications, and the lias lime. The last in its natural state is of a dark blue colour, hence called “blue lias.” There is considerable adulteration, however, to be guarded against, such as sand, &c., and the test with an acid to detect the amount of effervescence that takes place should be adopted in important buildings. Mr. Reid suggests, as a better plan, to burn a little of the stone in a small kiln to judge by the slaking; and generally, hydraulic lime should have a clayey odour and an earthy texture.

ARCHITECTURAL MOSAIC.

V.—MODERN MOSAIC (continued).

THE revival of marble mosaic as an adjunct to architecture is even more recent than that of ceramic and glass mosaic. The kind of marble work practised almost exclusively during the middle ages was the *Opus Alexandrinum*, in which every fragment was shaped into some regular geometrical form; but of true marble mosaic (*Opus musivum*), in which the fragments were of irregular shape, and each fashioned by the workman as he required it, we can call to mind no later example than the Baths of Caracalla, at Rome, which date back so far as the year 211 B.C. But about twenty years ago an obscure body of Italian

workmen commenced its re-introduction, travelling about to various cities of Europe, like the Freemasons of the middle ages, wherever they could find employment, with very little organisation and very small means. Their work consisted mainly of an imitation of the ancient *Opus incertum*, that is, small irregularly-shaped fragments of variously coloured marbles, not combined into any particular pattern, but with an eye to a pleasing combination and harmony of colour, which was surrounded by a border of more regular *Opus vermiculatum*, also in marble, in which pictorial designs were introduced. These travelling workmen laid many pavements of this kind in Paris, Vienna, Pesth, and in several towns of the South of France, among which may be named Nîmes and Lyons, before the value of their work began to be generally recognised. The introduction of similar work into this country is due to Mr. Burke, of Newman-street, London, whose attention was attracted by a pavement at the Tribunal of Commerce at Paris, about six or seven years ago. That gentleman at once engaged the services of a number of these workmen, and commenced the construction of similar pavements as a special business both at London and Paris. Since that time his firm have laid many pavements in public buildings, among which may be specified the Manchester Town Hall, the Persian Court of South Kensington Museum, and all the floors of the new Natural History Museum not yet opened. Other firms have also entered largely into the trade, which is growing with wonderful rapidity, and the list of architects who order its use contains many of the most eminent names in the profession. One singular fact in connection with this kind of work is that not only do all the good workmen come from Italy, but the best workmen are all from one particular province, that of Udine, north of Venice. It is only now and then that a Piedmontese, a Milanese, a Roman, or a Neapolitan can be taught to be a good mosaicist in this particular branch of the art.

There are two kinds of work recognised—major and minor. In the major work, the tessere are placed by hand in fairish order, with an eye to combination of colour; whilst in the minor, the fragments being previously mixed as to colour in certain proportions are scattered at random over the surface of cement, somewhat resembling the way that stones are spread over a macadamised road. One element of the greatest importance in laying these pavements is the foundation. We have seen pavements which have given way because fragments of wood and decaying rubbish have been carelessly left underneath. The following is Mr. Burke’s description of the process of laying his pavements. Upon a firm and solid bed of concrete is imposed a coating of mastic, varying in substance according to circumstances. Into this mastic the tessere or irregular cubes of various coloured marbles about half-an-inch square, are hammered, so that each one is entirely surrounded by the cementitious preparation, the roughnesses on all sides affording an excellent key. A sufficient surface being laid, the workman with a rammer, somewhat similar to those used in roads for driving down granite paving, beats and rams down all the tessere, and then further consolidates the whole, by rolling over it a heavy granite or stone roller. It will thus be seen that the principle of this work is the thorough and entire consolidation of the marble cubes with the mastic, and of the latter with the concrete foundations. When the mastic has set the floor is sanded down to a uniform level, and the colours are brought out by various different means.

Marble mosaic has also recently been introduced as a means of profitably employing the female prisoners in the convict prison at Woking. Such labour is, of course, not

expensive, and the result is a very cheap pavement, which is manufactured in the prison and supplied at a fixed price per square yard. The floor of the passage in the Architectural Court at South Kensington is laid with this material, where the design, by Mr. Moody, is very effective, and the pavement appears smooth, well-laid, and likely to prove durable. We have also met with a statement that it is about to be used extensively at St. Paul's Cathedral, and we must confess to a sentimental objection to labour of such a kind being employed there. Every well-intentioned effort to reform criminals by giving them useful occupation deserves respect, but we cannot quite reconcile ourselves to the association of it with work which requires artistic taste and feeling. One could hardly walk over such a pavement in a sacred building, where every decoration is supposed to have some religious association, without being reminded of the pavement of a place of very different character, which some authorities declare consists entirely of "good intentions."

Opus Alexandrinum work is very little used in modern pavements, on account of the expensiveness both of the hard stones and marbles employed, and of the labour in sawing, grinding, shaping, and polishing each individual fragment; but we have seen some very good imitations of ancient patterns by Messrs. Poole, the masons to Westminster Abbey. The process of work, laying the shaped fragments in grooves of marble, is so like ordinary masons' work—executed, however, on a small scale—that any description of it would be unnecessary and superfluous.

Florentine modern mosaic is scarcely practised out of Italy. It is of two kinds, viz.—1. *Pietre-dure*, in which various objects are depicted in relief in coloured stones; and 2. *Pietre-commesse*, which consists of precious stones, as agates, jaspers, lapis-lazuli, &c., cut into thin veneers and carefully inlaid. Its use is very restricted, indeed, owing to the very expensive nature both of the materials and the labour which is spent upon them. None but the hardest stones are employed; every separate piece must be backed by thicker slices of slate or marble to obtain additional strength, and every minute portion must be ground until it exactly corresponds with the pattern previously cut. It is used chiefly for the decoration of altars and tombs, or for cabinets, tops of tables, coffers, and the like; and extraordinary effects are produced by taking advantage of the natural tints and shades of various coloured marbles in the imitation of fruits, flowers, and ornaments. In construction it most nearly resembles the ancient *Opus Sectile*, described in our first article.

Another kind of sectile work which is usually classed among the mosaics, although somewhat improperly so, is the modern French process invented by the late Baron Triqueti, and very effectively employed in the Memorial Chapel at Windsor. In this method the thin slabs of marble are very large, and shaped to follow the outlines of the design. White marble and marbles of various tints are employed, the outlines of the design being drawn in thin black marble upon a grey ground. When the whole is ground smooth and polished the effect is produced of a delicately-tinted and outlined drawing, with the advantage that it is fadeless and imperishable.

The marbles of Italy, as worked in modern days, present a wonderful variety of shades of colour, which enable the artists of Rome to reproduce many of the paintings of the great masters with such fidelity that close examination is required to distinguish them from the originals. A very extensive collection of these marbles, in countless varieties of shade, may be inspected by all who wish to see them on the walls of the Geological

Museum, in Jernyn-street. The ancients frequently combined both glass and marble mosaic in the same composition, but this practice is not adopted in modern work, which is always exclusively either glass, marble, or pottery. Modern marble mosaic is only just coming into use for wall decorations, but with the great variety of variously tinted natural limestones and marbles, we have lately seen, there can be no reason why for certain purposes it should not maintain its place side by side with glass and tile work. Messrs. Burke and Co. are at the present moment engaged upon very extensive marble mosaic decorations on the walls of the Guards' Chapel, in St. James's Park, under the superintendence, and after the designs, of Mr. Street. When these are completed they will form, we believe, the first important example of the application of marble, pure and simple, to artistic work of such a character; and as in the same chapel Dr. Salviati is also executing a "Majesty" in Venetian gold mosaic, the gift of Queen Victoria, the friendly juxtaposition of glass and marble work will give an admirable opportunity for study and comparison.

THE "BUILDING NEWS" DESIGNING CLUB.

THREE VILLAGE SHOPS.

THE competition for three village shops has elicited a more than usual amount of artistic ability. The conditions laid down were clearly in view of a design of modest pretensions, such as one may meet with in a village or retired suburb. "Motto J." which we place first, has cleverly seized the idea, and has given us something at once English and homely. The style is peculiarly quaint though unaffected; the slightly projecting gabled bays corbelled over the shops and running up through the eaves; the shop windows and corner oriel being exceedingly plain, but effective. The upper stories are proposed to be "of timber covered with plaster and Portland cement," the roof is of red tiles, and the woodwork is intended to be painted dark peacock blue with white window bars. In the plans the corner and end shops are well treated, the private entrance and stairs being placed transversely between the shop and living-room. The author makes the living room to answer for the kitchen. We do not understand how the stairs to the centre house is lighted unless by a skylight. Externally, the treatment of the shop-windows is pronounced without being unpleasantly suggestive of town or suburban fronts, and the pent-roof over the butcher's shop is appropriate and useful. "Sin circle" is certainly clever in his plan. The corner shop appropriated to the grocer is ingeniously arranged in the supporting piers and window fronts, a small side bay being shown in the return street. The hall, stairs, and offices, are compactly planned, but the other shops are cramped by the halls and staircases. Large sitting-rooms are obtained over the shops. There is a pleasing variety in the elevation and in the treatment of window-fronts, though the brackets below breastsummers would have been better omitted. The stories above are half-timbered, the upper story tiled, and the author has pleasingly varied the houses without ostentation. "Noah" sends a charming old English front, the centre house being timbered with gable while the two end houses are in brick. There are decided touches of Queen Anne in the windows and small bays, but the composition, with the exception of the balcony corner, which does not well carry round the lines, is pretty coherent. The shop windows, certainly, are small. The author's plan is compact. Behind the shop in each house is a small kitchen with projecting scullery and pantry, the coals and dust forming a narrow lean-to on the other side. Stairs are well placed and lighted, and a living-room is obtained over each shop. The author has, however, not economised his space to advantage in the case of the corner (butcher's) shop. In this case the entrance might have been at the side, instead of through the shop from the front. One of the best designs we have received, equal in merit to the two last, is "Be to its merits very kind," &c. The author of it has shown a very decided improvement since he joined our club,

which we are very pleased to acknowledge. His elevations exhibit a suitable and pleasing Old English treatment, simple and highly picturesque, without any affectation of manner or extravagance of feature. The corner house is gabled and devoted to a butcher's shop, the other two houses are relieved by bold plain square bay windows two stories high gabled as dormers in the roof. They have plain mullions and casements, and are tiled between. A pent roof divides the shops from the upper stories. The style chosen is a Late Domestic Gothic verging upon the Revival, and exemplified in numerous old buildings in London and elsewhere of between the 16th and 17th centuries. Two well-drawn perspective views are given, but the drawing of the larger one is taken from a point of view that is not artistically, if literally correct. Although the point of sight is supposed to be somewhere within the gabled house, it is conventionally proper to show the return side in sharp perspective; as drawn, it has the appearance of being an acute angle. The plans are carefully worked out with all dimensions. The butcher's shop is 18ft. 6in. by 12ft. 6in., with a side private entrance; behind a living-room and kitchen projection. The two other houses have front passage entrances to the private rooms, bayshop windows, small living-rooms behind the shops, and projection for kitchen offices; on the first-floor sitting-rooms are obtained over the shops, and the stairs and conveniences are well lighted and planned. "Josephus Orangeblossom" contributes a carefully drawn design in a suitable Gothic style; the middle house is gabled and timber framed, and the end houses are tiled in the upper story. The shop windows are simply arched openings, filled in with mullions and transoms. The grocer's shop is at the corner with canted corner entrance. An entrance on the return side leads into a kitchen, the scullery, pantry, fuel shed, &c., being comprised in a long shed in rear. The middle house has a lobby entrance with side-door to shop. This economises the space for show-board and window front; the stairs placed crosswise between shop and kitchen are ingeniously lighted by a small area at the side of latter. Upstairs each house has a front sitting-room and back bedroom, and three small bedrooms on the second floor; these are certainly cramped. Considerable ingenuity is evinced in the planning, and a flue for ventilating the butcher's shop shown. The author sends a sketch perspective. "Honey Dew" is an appropriate and picturesque design in a timber and parget style, with large end gable and dormers. The shop-fronts are neat in treatment with recessed entrances; the upper windows have mullions and casements, corbelled as dormers of the bedrooms in roof. The shops, 14ft. by 13ft. 8in., have angle doorways; a kitchen with scullery as lean-to projection, and a stairs fronting the private entrances make up the ground-floor. Above shops are sitting-rooms and bedrooms behind. We take exception to the front w.c.s. over private entrances, which cut off a passage at side of sitting-room. The drawings are carefully executed. "Pogmore" sends a more pretentious row suitable rather for a suburb or small town, though not without merit. The shop-fronts are too ostentatious for a village, and the author has not been successful in breaking through that stereotyped combination of shop-front and house which makes the modern street so wearisome. Otherwise the upper windows are effective. In plan the faults are the cutting up of the fronts of the two middle houses by an entrance on each side of it; the long narrow passages to the living rooms behind, the ill-lighted stairs, the want of a pantry near living room, and the small bedrooms in the second-floor. A basement is provided. The author estimates the row at 6d. a cubic foot, amounting to £2,513. Design marked "Curiose" is not without merit in external treatment; the shop-fronts and upper timbered stories slightly corbelled out are picturesque in grouping, but the angle protuberance above roof is clumsy, and the gable between two houses makes them appear one. The private entrances are cramped and the stairs in front of doorways awkward, besides unnecessarily contracting the shops. The kitchen and scullery look small, and the upper arrangement of landing and rooms not economical. Estimate is £1,490. "Dunwich" sends an elaborate design in Late Gothic with three gables, and timber filling-in. The general features are suitable, but the detail is too ornate. The butcher's shop would have been

better at the corner. The plan is not without merit, but the front bed-rooms over the corner shop are cut up wastefully. The kitchen and offices are in basement—not desirable for a village. The estimate is £2,095. A little over-timbered is "Veritas Vincit"; the studwork is excessive almost to the verge of satiety. The staircases in the inner houses seem poorly lighted, otherwise the plans have merit and are well studied. A basement is provided for coal and goods. "Enigma" has a somewhat similar plan, though there was no necessity for a passage entrance between parlour and kitchen projection. The elevation is of framework and plaster, with flat projecting windows gabled at top. The timber filling-in between windows is a little too fanciful perhaps; but on the whole the treatment is suitable. "Juvenis" attempts the same style, but clearly falls into the common snare of superfluous ornament. The first-floor plan is spoilt by a small bedroom at the side of front sitting-room; and the narrow bedrooms above are quite as wasteful. A note says the "plastering is to be coloured red, and the studs to be painted dark brown" a contrast certainly rather too harlequinade-like to please us. "M. in leaves" arranges his frontage after a novel plan. The butcher's shop and house is detached from the other two by a passage-way for barrows, and the entrance halls and lobbies form projecting wings on the ground-floor, though the bedrooms on the upper plan sail over the areas left for light. The shops have by this arrangement a wide frontage. The elevation suffers from a peculiar irregularity of the windows and the flat-pitched dormers. The estimates are for butchers' and drapers' shops, £752 each; and for grocers', £833 17s. The elevation of "Amateur" is cut up rather unpleasantly, and there is a strained look about the centre gabled projection and hipped roof. In plan the side-entrance and staircase are awkward, and the lighting of the other stairs through closets unsatisfactory. In other respects economy has been studied. "Try" is economical in his planning, but the shops are pinched up by the entrances and breaks in walls, and the fronts are rather fantastical. It would have been better to have made a porch to each of the middle houses, and to have had a side doorway therefrom into shop, instead of reducing the show space by two doorways. The elevation is simple and broadly treated, and without the centre projecting porchway it would have possessed merit. The author has evidently improved in his style, and has a correct idea of country shops. "Ogmores" also has a simple but pleasing elevation, but the bay windows to the shops are too domestic-looking. The arrangement is certainly clever. "M. in leaves" (No. 2) shows a variation both in plan and elevation. Back shops are provided in connection with the front, and the plan is less objectionable as regards the construction; on the other hand, his elevations we have above referred to is better. Design by "Boz" is timber-framed, moderate, and suitable as regards elevation; the shop-fronts are artistically handled, but the plans are not contrived with sufficient regard to frontage of windows. "East Anglian" runs pretty close as regards plan. A lobby entrance is shown to two of the houses and shops, and the arrangement appears economical. We do not like the shop windows, but the upper part of elevation is better. "Elève" has attempted too much; the elevation would be more suited to a town thoroughfare, and the brick treatment of projecting windows and gables does not suggest a rural locality. The plans are better. "Factable," too pretentious in the ornament introduced; the passage entrances are wasteful, and the sitting and bedrooms are cramped. "H. T.," shown by a very sharp perspective sketch, is stronger in the plans than the elevation, which is covered with timber-work and panels. "Essayez" and "Speedy Method" both fail in their plans. The three gables of the first are undesirable; the latter's sketch is suggestive of something better in elevation. It is somewhat singular the lobby entrance has not been thought of by more as the least wasteful kind of entrance. In most of the plans, the back room has been made either a sitting-room or kitchen, with scullery and offices projection, the parlour being obtained on the first floor; but the best way of getting the staircase to avoid a cramped hall, and to preserve privacy, has been overlooked in many instances.

ENTRANCE GATES IN WROUGHT IRON.

The designs for these are not so satisfactory.

"Curiose" we place first, though the treatment of the panels is rather suggestive of cast iron than wrought. The piers are cleverly managed. "Motto J" is a much more spirited and original design; the cross braces are made the principal means of ornamentation, but the scrolls and thistles which spring out of them seem to lack coherency with the other panels of gate. The piers are well treated, with iron lamp-stands upon the top. A Japanese motive prevails in the ironwork, which is certainly appropriate for wrought iron. The next design of merit has the motto "Truth shall prevail." The author adopts a Gothic design; the lower panels and the upper filling-in with scroll work are decidedly characteristic of hammered metal, and the ornamental bosses are conventionalised in the right spirit. The piers are rather commonplace. "Nemo's" design is not without elegance in the ornamental treatment, and is a close pattern, but the gate-piers look like cast-iron, and are certainly effete reproductions. "Con Amore" sends a suitable design for wrought work. "Melina" is more characteristic of casting, but the details and general design are meritorious. "Ogmores" gates are also clever in the leafage of lower panels and trefoiled treatment above; the framing is also light, but the piers are less satisfactory. "Corvis" sends two designs. The upper one is too Gothicsque, the lower reminds us of one sent to the Paris Exhibition by Messrs. Barnard, Bishop, and Barnard. "Be to its merits very kind," &c.: this is a pleasing design, if the terminal ornaments were less in height. The alternative sketch has merits, but the spiral points are redundant. The details are well shown. "Yes or No" indulges too freely in long, unsupported sprigs of iron, which could easily be knocked or wrenched off; in other respects the design is meritorious. "Steffano" sends a rather used-up Gothic pattern; the twisted rail and standards in upper panels do not appear to belong to the lower part; the pier caps are wanting in good design. "Try" sends a better conception for hammered work, though the pseudo-Gothic piers are rather ludicrous in design. "Norwich" is too florid; the riveted sprigs and the upper folial treatment are out of place. A rough sketch is sent under "Dum Spiro Spero," but the idea is commonplace. "Signum" is more suited for a cast-iron treatment, but the design lacks thought and purpose.

NOTES ON BUILDING CONSTRUCTION.— MATERIALS.*

THE third part of the advanced course, arranged to meet the requirements of the syllabus of the Science and Art Department on building construction, is just issued, and we take the opportunity of giving our readers some idea of its contents. We may mention that these notes are published with the intention of furnishing the student with information to enable him to pass the Honours examination of the Department. The volume now on our table deals with building materials, the two former volumes having treated of construction generally. Various authorities have been consulted in the preparation of the present notes, and we observe that the information required for the second stage, or that of an elementary kind, is printed in largotype, so that students can confine their attention to the notes necessary for their particular examination. The contents of Part III. show the scope of the work. Under the head of "Stone" we have the general characteristics of building stone, its durability, structure, facility for working, hardness, strength, weight, appearance, position in quarry, natural bed, destructive agents, as lichens and molluscs. The tests used for stone are pointed out, as its resistance to crushing, its absorption, its immersion in a solution of sulphate of soda (Brard's test), the acid test, Mr. C. H. Smith's test, &c. The scientific classification divides building-stones into—1, Siliceous; 2, argillaceous; and 3, calcareous; though for practical purposes they are arranged under—1, granites; 2, slates and schists; 3, sandstones; and 4, limestones. The position in the quarry is described, and the various beds of Portland discriminated. The notes on "natural beds" do not give us much definite information. It is stated that the natural bed is easily seen in the position of imbedded shells, "which were, of course, originally de-

posited horizontally; in others by thin streaks of vegetable matter or by traces of laminae which generally show out more distinctly if the stone is wetted." In some instances no signs of stratification are visible, but a good reason it is said can tell the natural bed by the "feel" of the grain in working the surface. Unfortunately, "good masons" are rare, and such a test is not likely to be of much advantage to the architect or engineer, to whom a knowledge of "natural bed" is most desirable. We believe an acid test, such as immersion in sulphuric acid, and a close or microscopic observation of the stone to be more practical. The latter test is used for discovering the most durable stone, though Mr. C. H. Smith's test is simpler and generally applicable. We give the note—"Break off a few chippings about the size of a shilling with a chisel, put them into a glass about one-third full of clear water, let them remain undisturbed at least half an hour. The water and specimens together should then be agitated by giving the glass a circular motion with the hand. If the stone be highly crystalline and the particles well cemented together, the water will remain clear and transparent, but if the specimens contain uncrystallised earthy powder the water will present a turbid or milky appearance in proportion to the quantity of loose matter contained in the stone. The stone should be damp when the fragments are chipped off." The notes on granite will be found pretty complete: a table of the principal quarries in Great Britain and Ireland is given. The varieties in common use are indicated, the most esteemed being those from Peterhead, Rubislaw, Stirling Hill, Dalbeattie, Ross of Mull, and others from the neighbourhood of Aberdeen. The information on slates will be found of service. As to quality, it is remarked, "a good slate should have a very fine grain"; veins are objectionable, particularly when they run with the length of slate, as it will be liable to split along the vein. The sizes of the slates and the various descriptions in use, the tests and different forms of slate are given. Similar information on sandstones, limestones, including marbles, is furnished, derived from a variety of sources. The notes on the principal kinds of stone in use are of practical value. Thus, of sandstones, Bramley Fall, the Yorkshire varieties, Seotgate Ash, Forest of Dean, Mansfield, and Cragleith, are mentioned. Of limestones, the marbles, Bath-stone, Portland, Chilmark, Kentish rag, yellow Mansfield, Caen, &c., are described, and these notes include the chemical composition, the several beds, uses, and the buildings in which each stone has been used. Artificial stone, such as Ransome's, Victoria, Chance's, and Rust's, is made the subject of a separate chapter; but the most suggestive chapter is that on "Preservation." The various kinds of processes are described under two classes, the first consisting of preparations containing dissolved organic substances, and the second of solutions of substances which act upon the constituents of the stone, or upon one another (when more than one is applied), so as to form insoluble compounds which fill up the pores, and make the stone denser, and more impervious and able to resist atmospheric influences. As regards paint, oil, paraffine, soft soap, they are only temporary protectives and discolour the stone, and it is stated on the authority of Dent, "There is no evidence to show that any methods such as these are likely to be successful in affording permanent protection to stone." According to the same author, the solution of baryta followed by a solution of ferro-silicic acid so as to fill the pores with an insoluble ferro-silicate; or a soluble oxalate of alumina applied to limestone, possesses the advantage of producing, by the changes they undergo within the stone, an insoluble substance without giving rise to the formation of any soluble salt likely to cause efflorescence, which attends the use of alkaline silicates. The tables will be found of considerable use. In the chapter on bricks, tiles, and terra-cotta, the constituents of brick-earth, and their chemical effect, are first treated, after which follows the classification of earths into plastic clays, loams, or marls; the colour of bricks is explained, and brickmaking is described and illustrated in some detail. After these the varieties of bricks are noticed, and the Building News of 1874 is quoted. The means of testing good bricks, their size, weight, and strength, both under compression and cross strain, are fully entered into. "Hurst's Handbook" and "Grant's Experiments" are laid under contribution here. The different forms of bricks are illustrated by diagrams; terra-cotta

* Notes on Building Construction. Part III.—Materials. London: Rivingtons.

and clay wares are also given. Thus Jennings', Doulton's, and the Broomhall Company's patents are figured, and the various forms of tile roof coverings noticed. The chapter on limes and cements appears to deal with these materials in a thorough manner. Concrete is thoroughly explained in its various forms and applications, and our own pages have here also been largely consulted. Selenitic, tar, iron, and lead concretes are described. In the notes on "efflorescence on walls," or "salt-petreing" as it is called, some valuable hints are given—namely, the avoidance of damp bricks containing iron pyrites or burnt with coal fires, limestones containing magnesia, also sea-sand or sea-water, and the following remedies are quoted:—
 "In the case of ashlar work, the surface may be covered with a wash of powdered stone, sand, and water, which is afterwards cleaned off. 2. Painting the surface is sometimes efficacious, if it is done before the efflorescence commences. The mortar before use may be treated to prevent it from causing efflorescence (1) by mixing with it any animal fatty matter; General Gilmore recommended 8lb. to 12lb. of fatty matter, 100lb. of quicklime, and 300lb. cement powder; (2) potash salts may be rendered harmless by adding hydrofluosilicic acid. Burnell, Gilmore, and Captain Abney, R.E., are the authorities quoted in these notes. Iron, and the other metals used in construction, form another chapter; the market forms of wrought iron, and their value and use are noticed, also brands of iron, varieties and tests for steel, the various processes for preserving iron and steel are detailed, and in short every kind of datum that has been accepted is furnished in the pithy form of notes. Timber and its decay, paints and varnishes, glass, and even nails find a place. We must caution our readers, however, not to think that the work is original, or that it professes to be a systematic treatise on materials. Its greatest value is that every fact has been winnowed of unnecessary verbiage, and given in the form of crisp notes, though these have been arranged in a rational order.

THE DISEASES OF BUILDING TIMBER.

IT seems odd that timber trees should be almost as liable to disease as man is, but it is undoubtedly true, and bad management causes the disease both in men and trees. Mr. James Brown, LL.D., states that the principal diseases likely to be brought on forest trees by bad management are:—1st, bark-bound; 2nd, moss or lichen upon the bark; 3rd, stag-horn tops; 4th, scale; 5th, premature bearing of seed; 6th, dropsy; 7th, ulcers; 8th, wounds; 9th, stunted growth of the young wood. Now, in addition to these defects, we have in the manufactured timber such matters to contend with as doatiness and the excess of sap and weariness, concerning which so many complaints are made. The disease called bark-bound is caused by the bark being girdled or bound about the wood of the tree, thereby preventing the proper flow of the sap, and also arresting the descent of woody matter between the wood and the bark. In this case, if the cause of the disease be not checked in proper time, the vital fluids become gradually checked, till at last the passages become entirely closed, and as the natural consequence the tree dies.

The appearances of lichen on the bark of trees is not always a decided symptom of disease in them, but may be occasioned by a temporary derangement in the outer bark; and if observed in time, like any other disease, may be arrested by removing the cause before it has had time to become decidedly fixed in the constitution of the trees affected.

Willows and poplars, which luxuriate in a soil rather damp than otherwise, generally become stag-horn-topped, when grown in a soil too dry for their healthy development. Elm, oak, ash, plane, &c., generally become in the same condition when the soil in which they may be growing is too damp for maintaining them in a healthy state.

Scale is a small white insect found clinging to the bark of some species. In forest trees it is most frequently found upon the ash while in a young state. The scale is easily distinguished by the appearance of the insect upon the surface of the bark. It presents itself as very numerous small white spots, like those on the bark of the birch; and if the observer

take a stone, and draw it roughly along the tree, he will kill many of the insects, and see their blood give a red tinge to the bark. As to premature bearing of seed, trees in a healthy, rapid-growing state are seldom found to produce seed till they have arrived at a considerable age and size. Generally speaking, any forest tree, bearing much seed, under forty years of age, is not likely ultimately to arrive at a valuable size. When a young tree produces a profusion of seed, there can be no doubt that it is in a state of premature decay; therefore we may be at once assured that such trees will not become valuable as timber.

Dropsy generally takes place in forest trees, either where the soil is too rich for them, or where there is an excess of moisture about the roots. The cause of it appears to be that the roots take into the system of the tree an excess of juice, which the bark and leaves cannot assimilate. In this disease unnatural swellings are observed on some part of the stem, which begin to rot and throw off the bark. It is incurable, and the only thing is to prevent it by attention to the ground being well drained and not over-rich.

An ulcer much resembles dropsy, but it is mostly confined to the larch and others of the coniferous tribes. Its appearance is that of a running sore upon the side of the stem, where the natural juices escape in the form of a hard resinous matter. This disease is mostly found upon young trees of these tribes, and is frequently occasioned by insects lodging their eggs in the inner bark, where the young live for a time, and destroy the albumen.

Wounds are often caused by the trees receiving damage on their stems by having the bark peeled off by accident in some way or other, which may prove injurious to their health, and not unfrequently be the cause of death; but any simple wound made upon a healthy tree is seldom or never found injurious, but soon heals up.

The stunted growth of young wood is at once apparent by the very short annual growth of young wood upon all the lateral branches, and may be in general the natural result of any of the diseases already described. Every tree when it has attained its full size and development of its nature, however healthy it may have hitherto been, gradually begins to fail in making young wood. This is the work of time, doing to the old tree what the disease does to the young.

Perhaps there is no British tree so worthy of cultivation as the larch. There are very few purposes for which the oak is now used, for which the larch would not answer as well. It grows rapidly, and attains maturity long before the oak. Unfortunately it has been planted haphazard in all kinds of soil, and the result has been the development of various forms of disease, and indeed whole plantations of it have died. The greater part of the diseases that are found to prevail in our larch plantations proceed from the deficient warmth about the roots of the tree, so that when cold cutting winds and slight frosts set in in spring, they are unable to resist the attack; their vessels shrink, their fluids become deranged, and disease follows as a natural result. But there can be no doubt that, judiciously managed, we might have a very valuable crop of larch every year for building purposes. It makes excellent floors for warehouses, and very difficult of ignition, a quality which cannot fail to recommend it, and the durability is well appreciated by all who have used it.

THE ACOUSTIC PROPERTIES OF BUILDINGS.

A PAPER was read the other day before the Musical Association on the above subject, and Mr. Cecil Saunders, the author, promulgated certain principles of interest to the architect, though we may differ from him in details. He justly urged it was difficult to find a building equally well adapted for the hearing of a large number of both slow and rapid music. Every listener must have 5 to 6 square feet of area; the latter figure was not too much for good music to be heard in comfort, this area including seat and passage room. For 1,000 auditors this would give 6,000 square feet, or 30,000 feet for 5,000, which was thought the greatest number that could hear well. Referring to the usual rectangular shape of room with end galleries, the author said that if such a room be very long, the waves of the sound were interrupted, and did not reach the distant listeners with their

initial crispness and force: if the room was too broad, there was a tendency to echo, from the sound being reflected from the walls as well. A circular hall was condemned when it had a high and vaulted ceiling; but the Surrey chapel in Blackfriars-road was pointed to as one of the most successful places for hearing. Now, the Surrey Chapel was a polygon of 16 sides, and was surrounded by a gallery. It had windows all round, with a circular roof over the centre, surmounted by a small lantern. It accommodated about 1,400 persons. Now the Surrey Chapel, unfortunately for Mr. Saunders' theory, was practically a round building, and yet there was no echo, showing that buildings of this form could be by some modifications made to answer all the advantages of a rectangle. It had been found experimentally that buildings planned on the circle or square answered better than those of ordinary proportions; and the architect does not require to be told that rooms of rectangular form, exceeding in length a proportion of 2 to 1, make under ordinary arrangements bad concert-rooms for music requiring delicacy of execution and expression. Mr. Saunders pointed to a square room with rounded corners as the model form of concert-hall, and thus has hit upon a mean between the circular and square forms. He proposes to place the orchestra, to hold 700 performers, in one corner, with tiers of seats in the angle. The organ he would make as low as possible, so as to permit of a low ceiling; the greater part of this instrument he proposes to place beneath the orchestra, with this object. A low ceiling is admitted by every authority to be necessary for acoustical effect, as every foot of additional height lessened the horizontal distance to which sound could be carried. An auditorium to seat 5,000, it was suggested, might have a circular arrangement of seats, and those should be so adjusted as to levels that those in the rear should be able to see over the heads of those in front, the seats in the angle opposite organ being almost as high as the top of orchestra. By this arrangement the sound-wave would reach those at the extreme end of room as clearly as those in front. The author recommends wood or zinc for the ceiling, the boards being tongued and glued together; plastering was considered the worst ceiling. It might be divided by circular or radial beams. With regard to the walls near orchestra, he thought looking-glasses to be good, as they reflected sound, but they should not be bedded in flannel; the other portions of walls he would board or cement. These suggestions, it will be seen, are somewhat crude, and we fear architects will be slow to avail themselves of them. We believe, however, the diagonal arrangement here recommended to be a good one for a square hall, as the waves of sound are better conducted than when the sound emanates from the middle of a flat side—one of the worst possible arrangements. The same advantage, however, can be gained by the octagon or polygonal plan. The chief difficulties are how to frame the roof to the best advantage, and how to obtain that architectural character desirable in a building. These are problems architects have yet to solve.

ERRORS IN TENDERS.

AT the meeting of the Portsmouth School Management Committee, on Tuesday week, the Sites, Works, and General Purposes Committee presented the following report:—"Your Committee report that tenders for building the Church-path School were received on the 18th instant, as follows: D. W. Lewis, £6,550; Longley, £7,980; Evans, £7,989; Burlidge, £8,081; Light, £8,099; Roberts, £8,176; Hide, £8,190; Hayter, £8,360; Cooper, £8,840; Quick, £8,939; Jenkins, £9,394. The first-named tender was selected for recommendation to the Board, subject to an approval of sureties, but was subsequently withdrawn by Mr. Lewis, in consequence of an alleged error of £1,000. Your Committee, under the circumstances, recommend that the present tenders be set aside, and advertisements inserted in the BUILDING News and principal local newspapers, for the purpose of obtaining fresh tenders for the job."

The Rev. H. Kitching moved, as an amendment, that "Inasmuch as the architect, who in this matter is the professional adviser to the Board, has distinctly stated that there was no sufficient foundation for the excuse that too short notice was given for pricing out the quantities; and moreover, in his private responsi-

bility, further advises the Board that in his judgment an advertisement for fresh tenders would be so contrary to the practice in the building trade that it was not at all probable that any respectable contractor would again tender, this Board resolves that from the tenders now before the Board one be forthwith accepted."

A long discussion ensued ultimately, and the Board divided, when there appeared for the amendment:—The Revs. H. Kitching, E. B. C. Churchill, and W. J. Connolly; Messrs. Cudlipp, Byerley, Blake, De Fraine, Tamsett, and Long—9. For the adoption of the Committee's report:—The Chairman, Vice-Chairman, the Rev. J. Ellis, and Mr. Whitcombe—4. The amendment was therefore declared carried. Mr. Cudlipp proposed, and Mr. Whitcombe seconded, that Mr. Evans' tender be accepted.—The Vice-Chairman moved, and Mr. De Fraine seconded, that Mr. Longley's tender be accepted.—Mr. Blake proposed, and the Rev. H. Kitching seconded, Mr. Light's tender.—Mr. Long proposed, and the Rev. E. B. C. Churchill seconded, Mr. Burbridge's tender.—On the first voting, the numbers were: Longley, 4; Evans, 4; Light, 5; Burbridge, 2. The latter name being the lowest, was withdrawn, and the voting then was: Longley, 4; Evans, 4; Light, 5. On being again put to the Board, Longley's name was withdrawn, and the final voting was, For Evans: The Chairman, Vice-Chairman, Long, Whitcombe, Cudlipp, De Fraine, and Ellis—7. For Light: Tamsett, Kitching, Connolly, Blake, Byerley, and Churchill—6. The tender of Mr. Evans was therefore accepted, subject to the other arrangements. The architect of the school is Mr. George Rake, of Portsea, whose estimate was £9 a head, or £8,100.

FRENCH WOOD-WORKING MACHINERY.

IN the course of a series of articles on wood-working machinery at the late Paris Exhibition, the *Engineer* makes some interesting comparisons of the distinguishing characteristics of French wood-working machines with those of other countries.

The employment of timber benches in almost all classes of French wood-working machinery, remarks our contemporary, is a feature not entirely to be overlooked; timber certainly has its disadvantages in its perishable nature, and its want of power to offer the same steadiness in the bearings as cast frames, but, from the class of work turned out by French manufacturers, we cannot suppose that they are so far behind their foreign competitors as to be ignorant of these points, nor so wedded to past traditions as to be oblivious of surrounding improvements; therefore, before condemning what appear to us as deficiencies in strength, we must first consider whether there be not some other grounds for their preference for apparently inferior tools before passing a hasty judgment on the construction of machines which are able to turn out equally good work with the English and American, and enable the manufacturers to compete on a parallel footing. In looking at a hand-power circular saw bench we could not help feeling the weight of this doubt. The only parts not of wood are the saw blade, spindle, driving gear, bearings, and tie bolts, and the two latter are of the very lightest description, yet the work turned out was good. The spindle is on the rise and fall system, the fence of wood, and the machine brought within reach of the most modest capital. The same remarks apply in general to an endless band saw machine for hand-power, the whole of the frame and table is of timber, with ten tie-rods. The standard for the top pulley is exactly the same in form as that of the log saw described, and is totally disconnected, excepting through the blade with the lower pulley, which runs on independent plummer blocks bolted to the longitudinal stays of the bench. The time during which the wood-working machinery in the French department was in operation was generally confined to three or four hours per diem with intervals of rest, and it was, therefore, not subjected to anything like the strain put on the English and American machines, which were hard at work from morning until night, so of course it is impossible to make a thorough comparison of their durability on equal grounds; but there they were, apparently as steady as ever, and, as far as the tests they have withstood, if not in quite as cleanly, at any rate in as serviceable a condition as when they entered the building.

A rule apparently generally adopted by French manufacturers of endless band saws is that the free space on the table be equal to the diameter of the pulleys; another, that the adoption of any particular form of casting be repeated throughout in all similar machines, the dimensions varying, of course, with the size and capacity. For this reason, there is often a greater lack of symmetry than might be expected from so artistic a nation. For instance, in an endless band saw machine with canting table the bed-plate is made to suit the standard, instead of all being cast in one symmetrical form. The under frame is very heavy-looking, and the arrangement for canting the table just about as awkward as one could well conceive. Two semi-circular arcs are fitted below, passing through cheek pieces bolted to the frame, and clamped by ordinary thumb screws. In all cases the blades are protected both fore and aft, the table by wooden splasher guards, the legs of the attendant alone being left exposed to the entanglement of a falling blade. Counterweight tensions are things unknown, a hand-wheel and screw being the only means adopted for adjustment of the blade. Wooden guides are in most cases fitted above and below the table, and generally one at the back of the blade. All pulleys are fitted with flanges, and, with the exception of the above-mentioned omission, as much attention is paid as possible to the protection of the attendant against accident. Timber framing is also employed for rests for sharpening band saws, and some of them are very primitive and rickety-looking machines.

THE MELBOURNE EXHIBITION.

THE foundation stone of the International Exhibition buildings, in the Carlton Gardens, Melbourne, was laid by the Governor on February 19th. The building will be an important addition to the architecture of Melbourne. The design is the work of Messrs. Reed and Barnes, the architects of the new Wilson Hall of the University of Melbourne, of which we give a description elsewhere, and many of the leading city structures. The salient features of the building (which will be the largest Melbourne has yet known) will be, first, a dome higher than the highest spire in the city, flanked by a number of smaller towers of pavilion shape; and secondly, a variety of ornamental details, mostly in such high relief as to utterly efface the dead-wall effect but too frequently conveyed under similar circumstances. The building, excluding the temporary annexes for machinery, &c., is cruciform, consisting of a nave 500ft. long running from east to west, and cut through its centre by a transept 270ft. deep, the ends of which are north and south. The main front faces Victoria-street, at nearly the point where stand the Model Schools. This transept is the leading feature of the fabric. At its south end is the chief portal—a tall arch 40ft. wide and 60ft. high, deeply recessed, and reached by a flight of broad stone steps. On each side are square towers 105ft. high. Some 50ft. behind the portico, and at the point where the transept intersects the nave, rises the dome, octagonal in form, and reaching the height of 223ft., being about 130 ft. above the main roof. As the dome rears itself above the main roof it is surrounded by tolerably massive columns, dividing groups of windows, and just above that point the tapering gradually begins. At its base the central tower is 100ft. square, but as its octagonal shape becomes defined the diameter is contracted to 60ft. The rest of the building is in keeping with its main features and with the nature of its design, which may be characterised as Italian Renaissance. On each side the central tower runs the nave, which from end to end measures fully 500ft. The exterior walls are, however, not those of the nave, but of the courts which intervene alongside them, an arrangement which accounts for the way in which the windows are designed. Finally, the exterior of the building may be said to be completed by a pavilion tower, 80ft. high, at each corner. The interior as it will strike the visitor may be briefly described. Entering the building by its south and chief portal, and passing beneath its fanlight and concomitant adornments, he will at once face the transept, 70ft. high, 60ft. broad in the clear, and besides, flanked with side galleries covering an additional space 20ft. wide. Proceeding some 30ft. further, he finds himself beneath the open dome, and at a point from which branch not only

the 270ft. long transept, running north and south, but the nave, which is 500ft. long, 70ft. high, and with the galleries, fully 100ft. wide. Between the nave and the outer walls on each side are several courts, each 200ft. long and 30ft. wide. The work of erecting the Exhibition building, and providing a large cellarage for wines, &c., is let to Mr. David Mitchell, for £61,407, and the contract is to be finished in 15 months from the 1st of the present month. The material to be used is brick, stuccoed. The roof will be of iron. The present plan is to build the dome of wood and iron, but it is not impossible that Mr. Reed's strong representations in favour of erecting the dome solidly of brick and iron from its base will be successful.

CHIPS.

The long-continued labour of restoring the lantern of the Cathedral at Rouen is complete.

New banking premises are about to be erected at Sudbury, for Messrs. Alexander and Co. Mr. Brightwen Bunyon, of Ipswich, is the architect.

It is intended to hold an exhibition of works of art and industry in York during the ensuing summer. The secretaries are W. Preter, M.D., W. Pumphrey, and E. Taylor, and communications should be addressed to them at the Guildhall, York.

A course of three lectures will be delivered in the galleries of the Natural History and Antiquities of the British Museum by Dr. Carter Blake, Lecturer on Comparative Anatomy, Westminster Hospital, on April 24, April 28, and April 30. Some of the keepers of the departments will give *vis à vis* explanations of the collections under their charge.

A novel copyright case was decided at the Maidstone County Court on Wednesday. A London artist, named Hills, having painted a picture of Old Maidstone Bridge, in oils, from a photograph taken by a local photographer, the latter sued him for having, as he alleged, infringed his copyright. After hearing the evidence, the Judge ordered the defendant to pay a penalty of a guinea, and to forfeit the picture, which was valued at thirty guineas, to the plaintiff. The plaintiff suggested that the painting should be given to the Maidstone Museum, and this course was agreed to.

A committee of the Medical Society of London was appointed last week to consider what measures could be taken to prevent the manufacture and sale of arsenical wall-papers. A great many facts in connection with this subject will be found in a little book we briefly noticed recently, "Our Domestic Poisons," by H. Carr, M.Inst.C.E. Mr. Carr is, we believe, actively moving for an inquiry into the use of dyes containing arsenic, and, if the statements contained in his book are true, there can be no doubt of the necessity for legislative interference.

The Rev. George Sanger, Vicar of Carlton-in-Cleveland, has made an extraordinary appeal in a circular addressed to his parishioners. He says:—"I feel sorry for the necessity of a letter to vindicate my conduct in rebuilding the parish church, which became so dangerous, after last August gales, that service could no longer be safely conducted under its roof. If I had not taken upon myself the rebuilding, the burden would have fallen upon the parish. You must all be aware that I have worked as few clergymen ever yet worked to rebuild the church. I worked as a bookbinder, to get the money, for two years; obtained the subscriptions by writing upwards of 2,000 letters; designed the building; acted as clerk of works and contractor; carved all the wood and stone, and worked with the men employed; and I ought to be allowed to complete the work in peace, not be publicly insulted for the benefit I have conferred upon the parish in building a church which, for elegance, is second to none in this locality." In conclusion, the writer begs for "£200 to finish the structure and its appendages."

An inquiry was recently held before Mr. J. T. Harrison, inspector to the Local Government Board at Buxton, respecting the borrowing of £2,500 by the Buxton Local Board for the purpose of completing the alterations at the new reservoir. Mr. J. H. Taylor, the surveyor, explained the efforts which were being made to render the reservoir serviceable by stopping the leakage. The extent of the leaks having been ascertained by coffer dams the reservoir had since been covered with concrete cement of an average thickness of 2½ in. to the height of 23ft. so that there was now little escape. The inspector questioned the witness in detail as to the cost of the work, remarking that he could scarcely understand that concrete cost 12s. 6d. per yard, even allowing for the nature of the work and the difficulty of getting material to it. He subsequently visited the reservoir and also the new gas-works in the Dale.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

ST. GEORGE AND THE DRAGON, BY PASSEROTTI.

By the courtesy of Mr. J. P. Heseltine, of Kensington, we are enabled to present our readers to-day with a double-page fac-simile reproduction from the vigorous drawing of St. George and the Dragon, by Bartolomeo Passerotti. The original was exhibited this year at the Royal Academy Exhibition of Old Masters, and belongs to Mr. Heseltine's valuable and interesting collection. Formerly, it formed part of Baron Denon's and the late William Mayor's collections, which were sold some three years ago. Passerotti's pictures are not familiar to us, but there is a fine drawing by him in a similarly bold manner in the gallery of the Uffizi, at Florence. During the past few years we have reproduced several of Albert Dürer's engravings, lent for the purpose by Mr. William Burges and others. These were so well received by our readers that it is our intention to give from time to time other similar reproductions chiefly taken from the original autograph drawings of the Old Masters. Next week we hope to publish an interesting reproduction from one of Albert Dürer's own drawings; also from the late exhibition at Burlington House, and belonging to Mr. Edward J. Poynter, R.A., to whom we are indebted for the loan of the original.

DETACHED VILLAS, BEDFORD PARK.

LIKE the other houses at Bedford-park, near Turnham-green, which we have from time to time illustrated in the BUILDING NEWS,* the one which we publish to-day is designed by Mr. R. Norman Shaw, R.A., the architect to the estate. The object of the varied designs is to produce a quaint and homely effect, similar, as near as may be, to an old village, and this idea is supported by the old trees remaining in the gardens and roads, which have been arranged to preserve as many of the old group of trees as possible. The problem of building a small house is one of which almost every dabbler at building considers himself a master, though probably few problems require more taste and skill to work out well, with regard to suitable and convenient

treatment as well as limited expenditure. This being so any attempts in the right direction will always have an interest, while a peculiar value belongs to any example of this kind designed by so great and experienced a house builder as Mr. Norman Shaw. The only thing, of course, required is that his plans shall be faithfully and thoroughly well carried out, else most of the particular points in the design and characteristics of the style employed will be lost, and the whole thing is soon rendered little better than a sham. The design published to-day is intended for erection at a cost not exceeding £1,400, red brickwork being used for the walls and red tiles for the roof. The house is arranged all under a roof of one span, and on plan is scarcely more than a square, unquestionably the most economical form of building. The house would be improved rather by projecting the entrance bay two or three feet, and so increasing in size the lobby and bedroom over, still preserving the quaint effect of the elevation, which would be lost probably to a great extent if executed with so slight a projection as that now shown for the part referred to. The church, which we illustrated in January last, is now in progress of building, and the Club on the Estate will be formally opened on Tuesday next, the 22nd, by a concert by members of the Bedford Park Musical Society. Several houses are in course of erection, and with good supervision will be free from the objections inevitable, perhaps, in the experience of the past.

HANDSWORTH PUBLIC BUILDINGS.

THESE buildings, which are now on the eve of completion, have been carried out under the direction of Messrs. Alexander and Henman, architects, of Stockton-on-Tees and Middlesborough, whose designs were selected in competition. As originally planned, there was to have been a large public hall in place of the free library as now erected, but the sanction of the Local Government Board could not be obtained for the carrying out of that portion of the design, and although such a building is much needed in the district, the Local Board were reluctantly compelled to abandon that portion of their scheme. However, in place thereof, rooms suitable for a public library have been substituted. Some modifications of the original plans and elevations were consequently necessary, but the leading features of the design have been retained. The buildings comprise various offices for the surveyor, rate-collector, medical officer, nuisance inspector, and rooms for a resident porter on the ground floor and on the first floor; the board room, two committee rooms, offices for the clerk, waiting rooms, &c. There are also several spare rooms on the second floor. To the free library there are on the ground floor lending and reference libraries, and above them is a large reading-room with a handsome open timber roof, of hammer-beam construction. At the back are extensive stabling, cart sheds, fire-engine house, &c. The contract for the bulk of the work was taken by Mr. Charles Steel, of Pitsford-street, Birmingham. The windows have been filled with rough tinted quarry glass by Messrs. Camm Brothers, of Birmingham, and Mr. Roddis, of Birmingham, has executed the carving. Mr. Wm. Peacey acted as clerk of Works.

CHURCH OF ST. JOHN THE EVANGELIST, MOLD, FLINTSHIRE.

THIS church, which is intended to be used as a chapel-of-ease of the parish church, for the accommodation of the Welsh-speaking portion of the population, is being erected on a site near the centre of this ancient border town. As will be seen from the view, the east end of the building is to the road, and for this reason the tower and spire have been placed on the north side at this end. The details of the structure throughout are of a plain and simple character. The outside walling is of local stone, of a buff colour, used in random courses; red Helysly is being used for all the dressings. The interior, which consists of nave, chancel, vestry, and organ chamber, is lined throughout with white pressed bricks, no plaster being used on any of the walls. The roofs are of red deal, stained, and the seats, the ends of which are square-framed, are to be of pitch-pine, varnished. Brown Italian tiles are to be used for covering the roofs. The present contract, which is let for a little over £2,000, includes building up the tower to the height of vestry ceiling. A sepa-

rate contract has been entered into for finishing the tower and spire. Accommodation is provided for 290 people. The contractor is Mr. Charles Holland, of Chester, who is carrying out the work from the designs and under the superintendence of Mr. John Douglas, also of Chester.

HOUSES AT MANCHESTER AND NORTHAMPTON.

A CORRESPONDENT has forwarded the sketches we publish of two houses—one erected at Northampton, from the design of Mr. E. W. Godwin, F.S.A., the other at Manchester, by Messrs. M. and H. Taylor. The house at Northampton was erected long before the one at Manchester, and was illustrated some time since in another journal.

DANGERS OF CREOSOTING TIMBER.

AN inquest concerning the death of Abraham John Roberts, who was killed by the falling of a timberstage at Norton's timber-yard, Wharf-road, City-road, was concluded on the 8th inst. Mr. Robert Walker, district surveyor of St. Martin's-in-the-Fields and St. Anne's, Soho, deposed that he had examined the pillars that supported the timber. In his opinion the accident was caused by the giving way of the centre post. The cause of the fracture of the post was that, although, from outward signs, it appeared to be perfectly sound, it was quite rotten in the centre. Its rotten condition was due to its having been creosoted. This process caused timber to be hermetically sealed, and thus the juice of the wood was not allowed to pass off, and rotteness in the centre was the unavoidable result. In answer to a question, Mr. Walker said that it had been found by experience that the process of creosoting was a failure, and that it worked great damage inside. It was not generally known that the process had a tendency to cause the interior part of the timber to decay. Mr. Bridgeman, the surveyor appointed by the coroner, said he had also examined the scene of the accident, and was of opinion that it had been caused by the fracture of the centre post, and that the fracture took place in consequence of the timber-stage being overloaded. There was a weight of 18 tons on the centre post at the time of the accident, while on the other two posts there was a weight of 9 tons each. It was undoubtedly the hollow condition of the centre post that caused it to give way. The condition of the post was such that the slightest vibration would be enough to cause it to break and bring the whole of the timber down without a moment's warning. The case was an exceptional one, and should be sounded as a warning note to other proprietors of timber-yards in order that they might use precautions against such an accident occurring in connection with their own property. The sad occurrence was no doubt purely accidental, but it was advisable that Messrs. Norton should take care in the future to guard against mishaps of the kind, as the same extenuating circumstances possibly could not be applied in another case. In answer to questions by the foreman of the jury, both of the surveyors admitted that, considering the exterior appearance of the supports of the timber stage, they should not have condemned them as unsafe had they seen them before the accident occurred. The jury returned a verdict of "Accidental death," but appended to it an expression of their opinion that "all supporting posts on the estate should be examined by a surveyor, and be repaired or removed as may seem necessary for the safety of all the men employed thereon."

The rebuilding of Vale-street Chapel, Wrexham, which had to be taken down on account of defects in the walls, is proceeding. Mr. Williams, the sub-contractor, brought his men over last week, the Wrexham Advertiser states, and took forcible possession of the place, and proceeded to lock up the tools of the men in the employ of the contractor, Mr. Hughes, and they were kept standing idle several days. An application has been made to the Master of the Rolls by Mr. Hughes, to regain possession of the building, in order that he may complete it, the sub-contractor having, it is alleged, broken the contract by drawing off his own men when the architect had condemned the work, which indeed was coming down, and had to be propped up.

Works of sewerage are being carried out for the Cannock Local Board; No. 1 contract has been taken by Mr. Clark, and No. 2 by Mr. Roberts, who has just commenced operations.

* BUILDING NEWS, Nov. 9th, 16th, and 23rd, 1877, and January 11th, 1878.

LIGHT AND AIR.*

By JAS. BALL.

FOR the full and proper enjoyment of immovable property, certain rights are necessary which come over or are connected with adjoining property. Thus, if a man have a field environed on all sides by the property of others, he clearly must have a right to go over the property of those others, in order to get to his own, or his property would be useless to him. Rights of this character are called easements: and among these rights are those which a man has to light and air coming over adjoining property to his own. These rights are founded almost exclusively upon customary usage—or, as it is termed, prescription—and formerly their protection and continuance depended mainly upon the establishment of custom, according to the old formula, from time whereof the memory of man runneth not to the contrary. Now, however, by 2 and 3 Will. IV. c. 71 (an Act for shortening the time of prescription in certain cases) it is enacted, by sec. 3: "That when the access and use of light to and for any dwelling-house, workshop, or other building, shall have been actually enjoyed therewith for the full period of twenty years without interruption, the right thereto shall be deemed absolute and indefeasible, any local usage or custom to the contrary notwithstanding, unless it shall appear that the same was enjoyed by some consent or agreement expressly made or given for that purpose by deed or writing." This applies only to light, it will be seen; and it has been held that, so far as light is concerned, this enactment destroys the custom of the City of London by which right to enjoy light and air might formerly in certain cases have been infringed, without any liability to make good damage caused by the infringement. Formerly in London, when rebuilding upon old sites, the new buildings might be carried to any height, notwithstanding an increase in height might interfere with the light formerly enjoyed by the adjoining property; but now London is subject to the general law, and light may no more be infringed there than in any other places. This has given rise to many lawsuits; indeed, there is scarcely any rebuilding in the City which is not menaced by a lawsuit, so valuable is the light there, and so thickly packed together the buildings.

The building or tenement in respect of which an easement is claimed or enjoyed, is called, by way of distinction, the dominant tenement, and that over which the easement passes is called the servient tenement: and it is a principle of the law as to easements, that the owner of the dominant tenement may not increase the burden of the servient tenement. It will be necessary to bear this in mind in our consideration of the present subject.

Before proceeding further, however, let us point out an important distinction which exists between the right to light and the right to air, notwithstanding that frequently they are treated as one and the same. In the case of the "City of London Brewery Company v. Tennant" (L.R. 9 Ch. 212) Selborne L.C. thus laid down the distinction. He said: "I observe that a formula has crept in . . . in which air is coupled with light. Now, the nature of the case that would have to be made for an injunction by reason of the obstruction of air is *toto cælo* different from the case which has to be made for an injunction in respect of light. It is only in very rare and special cases, involving danger to health, or at least something very nearly approaching to it, that the court would be justified in interfering on the ground of diminution of air." And then he adds a caution worth remembering: "Therefore, when witnesses say that there is a material diminution of light and air, and say no more, they are in truth reducing the value of their evidence as to light to the standard which must be applied to their evidence as to air, as to which such evidence is of no value whatever." This, of course, proceeds from the natural difference between light and air; as, for example, the rays of light always travelling in straight lines, and

the air following a distinct law of motion; so that an erection which would prevent the progress of the straight rays of light, and thus obstruct light, would not necessarily be an obstruction of air also.

Practically, therefore, all that can in most cases be complained of is the obstruction of light; and it will be found that most of the cases bearing upon our subject relate really only to light.

Extent of the Right.—In "Kelk v. Pearson" (L.R. 6 Ch. 890) James L.J. defined the extent of the right. He said: "The Statute [2 and 3 Will. IV. c. 71, s. 3, above quoted] has in no degree whatever altered the pre-existing law as to the nature and extent of this right. The nature and extent of the right before that Statute was to have that amount of light through the windows of a house which was sufficient, according to the ordinary notions of mankind, for the comfortable use and enjoyment of that house, if it were a dwelling-house, or for the beneficial use and occupation of the house, if it were a warehouse, a shop, or other place of business. That was the extent of the easement—a right to prevent your neighbour from building upon his land so as to obstruct the access of light and air, to such an extent as to render the house substantially less comfortable and enjoyable." In a prior case "Clarke v. Clark" (L.R. 1 Ch. 16) Cranworth L.C. had held that in cases of the obstruction of ancient lights, the real question is, not what is, scientifically estimated, the amount of light intercepted; but whether the light is so obstructed as to cause material inconvenience to the occupiers of the house in the ordinary occupations of life. And Lord St. Leonards, in his well-known Handy Book, says: "Wherever it is shown that the comfort or enjoyment of a man or his family in the occupation of his house is seriously interfered with, and still more, where he is prevented from carrying on his business with the same degree of convenience and advantage as theretofore, by reason of the obstruction of light caused by his neighbour's new building, there is sufficient ground for the interference of a court of equity." The mere invasion of privacy, however, by the building of premises which overlook one's house, but do not affect its lights, is no ground for the interference of the Court.

The Rule as to Forty-five Degrees.—There appears to have grown up some kind of idea, never clearly understood by anybody, as to forty-five degrees, with regard to the right to and obstruction of light. That notion was happily put into shape and explained by Selborne L.C. in the above quoted case of the "City of London Brewery Company v. Tennant," in which he said: "With regard to forty-five degrees there is no positive rule of law upon that subject; the circumstance that forty-five degrees are left unobstructed being merely an element in the question of fact whether the access of light is unduly interfered with; but undoubtedly there is ground for saying that if the legislature, when making general regulations as to buildings, considered that when new buildings are erected the light sufficient for the comfortable occupation of them will, as a general rule, be obtained if, the buildings to be erected opposite to them have not a greater angular elevation than forty-five degrees, the fact that forty-five degrees of sky are left unobstructed may, under ordinary circumstances, be considered *prima facie* evidence that there is not likely to be material injury; and, of course, that evidence applies more strongly where only a lateral light is partially affected and all the lights are not obstructed. I make that observation, not imagining that either at law or in this court any judge has ever meant to lay down as a general proposition that there can be no material injury to light if forty-five degrees of sky are left open; but I am of opinion that if forty-five degrees are left, this is some *prima facie* evidence of the light not being obstructed to such an extent as to call for the interference of the court—evidence which requires to be rebutted by direct evidence of injury and not by the mere exhibition of models." His lordship's words are so full and explanatory that nothing need be added to them upon this point; but the case of "Hackett v. Baiss" (L.R. 20 Eq. 494) may be referred to by the reader, in which case the Master of the Rolls followed the rule or reasoning laid down by the Lord Chancellor; and the case of "Theed v. Debenham" (L.R. 2 C.D. 165) further illustrates the point.

Remedies.—The remedies of a person aggrieved

by an invasion, or threatened invasion of his right to light or air are three-fold: (a) action for damages; (b) injunction to prevent invasion; (c) mandatory injunction.*

a. Action for Damages.—Where damages only are sought, the common and most convenient course is to proceed by action in one of the Common Law Divisions: and where the damage sustained by the obstruction of light or air can be easily and readily ascertained, this is recognised to be the proper course to pursue, and in such a case an injunction would most probably be refused. The remedy by injunction is intended mainly to meet those cases in which the amount of damage cannot be easily and readily ascertained.

It should be noted that in most cases, the fact of a plaintiff having recovered damages on an obstruction of light or air, does not condone the offence of the obstruction; and the plaintiff, or other person aggrieved, may go on bringing actions and recover damages in respect of the damage accruing from time to time by the diminution of light or air. The course which should be adopted, therefore, when the plaintiff has succeeded in proving himself damaged, is to make an arrangement with him, so as to compensate him for the damage sustained and to be sustained, and thus bar future actions.

In case an action for damages only be brought, the following is the form of endorsement on the writ:—

"The plaintiff's claim is for damages for obstructing the access of light [and air (†)] to the plaintiff's house."

b. Injunction to Prevent Invasion.—In cases where it is sought to restrain a threatened invasion of a right to light and air or either, a motion should be made in the Chancery Division for an injunction. The Chancery Division may also award damages. By 21 and 22 Vict. c. 27, provision is made for this, and sec. 2 is as follows:—"In all cases in which the Court of Chancery has jurisdiction to entertain an application for an injunction against a breach of any covenant, contract, or agreement, or against the commission or continuance of any wrongful act, or for the specific performance of any covenant, contract, or agreement, it shall be lawful for the same court, if it shall think fit, to award damages to the party injured, either in addition to or in substitution for such injunction or specific performance, and such damages may be assessed in such manner as the court shall direct."

c. Mandatory Injunction.—A mandatory injunction is a remedy granted in rare cases, by which one who has invaded the right to light or air, is compelled to take down the buildings by which the light or air is obstructed.

The following decisions and remarks should be attentively considered, as touching the various remedies for invasion of right to light and air, which we have just enumerated.

In the case of the "Curriers' Company v. Corbett" (4 De Gex, J. & S. 764) Turner L.J. held that "it is not every impediment to the access of light or air which will warrant the interference of the court by way of injunction, or even entitle the party alleging himself to be injured, to damages at law. In order to found a title to relief in equity, or even at law, in respect of such an impediment, some material or substantial injury must be established, and the onus of proving the injury must rest, of course, on the plaintiff." This decision points out the fact that in some cases there may be ground for an action for damages, although there may not be ground for an injunction. Westbury L.C. pointed out very clearly the distinctive remedies, and the reasons for them, in two cases which came before him on appeal. In one of these, "Jackson v. Duke of Newcastle" (3 De Gex & C. 275), he said: "Where the darkening of the ancient windows of a dwelling-house materially injured the comfort of the existence of those who dwell in it, the court would interfere by injunction."

Upon a similar principle, where the obstruction of the ancient lights of a manufactory or of business premises renders the buildings to a material extent less suitable for the business carried on in them, it is a case for injunc-

* To these remedies is added that, which a man has (according to Blackstone) to enter into adjoining premises and peacefully pull down any erection put up thereon, which interferes with his ancient lights: a remedy, it need hardly be said, seldom resorted to in these times.

† See the case of "City of London Brewery v. Tennant," cited at page 31, and note what the Lord Chancellors said to the association of light and air.

* This article was published in 1877 in a series of "Popular Monthly Law Tracts," edited by Mr. Jas. Ball, author of "The Popular Conveyancer," &c. The series was favourably noticed in our own and other journals and soon ran out of print. The author has had several applications to reprint this article, which formed No. 3 of the series, but, believing that the information would be more widely extended if published in our pages, has offered us the right of publication, of which we have availed ourselves.—Ed.

tion, and not merely for compensation in damages. The foundation of the jurisdiction [of the court to grant an injunction] appears to be that injury to property which renders it in a material degree unsuitable for the purposes to which it is now applied, or lessens considerably the enjoyment which the owner now has of it. The court considers that injury of this nature does not admit of being measured and redressed by damages.* And in the other case, *Isenberg v. East India House Estate Company Limited* (3 De Gex &c. 263), his Lordship said: "The common law remedy for a grievance of this description [i.e. invasion of right to light or air] is an action for damages: an action liable to be resorted to as long as the cause of damage continues. Upon that ground, and by reason also of the damage in many cases not admitting of being estimated in money, this court [the Court of Chancery] has assumed jurisdiction."

"The jurisdiction of this court, so far as it partakes of the nature of a preventive remedy, that is, prohibition of further damage, or an intended damage, is a jurisdiction that may be exercised without difficulty, and rests upon the clearest principles. But there has been superadded to that the power of the court to grant what has been denominated a mandatory injunction, that is, an order compelling a defendant to restore things to the condition in which they were at the time when the plaintiff's complaint was made. The exercise of that power is one that must be attended with the greatest possible caution. I think, without intending to lay down any rule, that it is confined to cases where the injury done to the plaintiff cannot be estimated and sufficiently compensated by a pecuniary sum. Where it admits of being so estimated, and where the evil sustained by the plaintiff may be abundantly compensated in money, there appears to me to be no necessity to superadd the exercise of that extraordinary power by this court." His lordship, in the latter decision, very concisely states the three-fold remedy against the invasion of right to light and air, and it would be gathered from the opinion expressed by him that the court would be chary of granting a mandatory injunction, but for later decisions, to which we shall presently refer.* *Turner L.J.*, in the case of the *"Currier's Company v. Corbett"* (cited at p. 39) seemed to consider it necessary to put the jurisdiction of the court to grant a mandatory injunction as a hypothesis. He said: "Assuming this court has jurisdiction to order a building, which, so far as it can impede the progress of light and air, has been actually completed, to be pulled down—a jurisdiction which, so far as I am aware, has never been assumed or exercised—this Bill seeks no more than a preventive remedy, and there can be no case for prevention where what is asked to be prevented has been actually done." The latter part of the last-quoted decision will serve as a hint to the draftsman to ask enough, and not, where a mandatory injunction is sought, to merely ask for an injunction to restrain further obstruction to light or air.

The power and the willingness of the court to grant mandatory injunctions are, however, demonstrated by some more recent decisions. In *"Senior v. Pawson"* (L.R. 3 Eq. 333) Wood V.C. said he had no doubt as to the jurisdiction of the court to order buildings to be pulled down; although in the case before him he directed an inquiry as to damages, instead of granting a mandatory injunction. In *"Beadel v. Perry"* (L.R. 3 Eq. 465), a case in which a mandatory injunction was granted, Stuart V.C. also gave some idea of what the court considered a ground for its interference. He said, "It seems to me that where, opposite to ancient lights, a wall is built not higher than the distance between that wall and the ancient lights, there cannot, under ordinary circumstances, be such a material obscuration of the ancient lights as to make it necessary for this court to interfere by way of injunction. . . . It has been clearly proved in this case that, opposite to the plaintiffs' ancient lights, the defendant has built a wall very much higher than the distance between them and the wall, and to that extent the defendant must, in my opinion, take his wall down. There must be a mandatory injunction to that effect." In the case of *"Lady Stanley of Alderley v. Earl of Shrewsbury"* (L.R. 19 Eq. 616) the court directed an inquiry as to damages instead

of granting a mandatory injunction, being of opinion that it could not in that case grant the latter remedy. In the case of *"Smith v. Smith"* (L.R. 20 Eq. 500) Jessel M.R. made some remarks concerning mandatory injunctions, to the effect that the court might grant them as unreservedly as others, and need exercise no more caution in doing so than in giving other remedies; and in that case he granted a mandatory injunction, not to be put in force for two months. It will thus be seen that whatever difficulty the court may have experienced in former times, as to granting the extreme remedy of a mandatory injunction compelling the offending party to pull the obstructive building down, no such difficulty is recognised now; although the leaving of the court still is to grant an inquiry as to damages under Lord Cairns' Act* instead.

In the case of the *"City of London Brewery Company v. Tennant"* (cited at p. 34), James L.J. said: "In all these cases as to light and air the Court of Equity is not administering any equitable relief strictly so called; but is giving an equitable remedy for the violation of a legal right: and the question before a Court of Equity in all these cases is substantially the same question as that which would have to be determined by a jury, under proper directions by a judge as to the principles of law applicable to the case."

Future Damage.—It frequently happens upon an obstruction of light that the amount of damage caused thereby depends upon the nature of the business carried on upon the premises injured; so that a slight diminution of light might cause but little or no inconvenience in some cases, whilst it would be a serious inconvenience in others. Therefore the question has arisen whether the Court, in dealing with the amount of damages where the present injury is small, has power to take into consideration possible injury of a greater extent in the future, upon a change of circumstances. The question does not appear, however, to have been settled until recently; and so far as the older reported cases show, it seems that the Court formerly considered it must deal with the present damage only, and not consider any possible future damage. In the case of *"Jackson v. Duke of Newcastle"*† *Westbury L.C.* said he had been unable to find any authority for taking possible future damage into consideration. But in the more recent case of *"Aynsley v. Glover"* (L.R. 18 Eq. 544) Jessel M.R. held otherwise and said that the Court is bound to consider the use to which the property the light of which is obstructed may be put. His decision was confirmed on appeal (L.R. 10 Ch. 283) when it was also held that where the ancient lights have been enlarged, the plaintiff should not be compelled to reduce the windows to their former size as a condition of obtaining an injunction.

Reserving Right to Light and Air.—Where the owner of property sells a portion of it, and wishes to reserve the easements of light and air to that he retains, he should so reserve them by the deed of conveyance of the portion sold. In the case of *"Ellis v. Manchester Carriage Company"* (L.R. 2 C.P.D. 13) it was held, following several previous decisions, that if a person having a house on his land the windows of which have existed for more than twenty years, sells a portion of the land, the purchaser may erect any buildings he pleases upon the land so sold to him, however much they may interfere with the light coming to the windows of the vendor's house, unless the conveyance by the vendor to the purchaser should have reserved to the vendor the easement of light to the house retained by him. The justice of this decision is apparent, although it appears at the first blush to be against the principle of the Prescription Act, which makes twenty years' enjoyment of light the base of an indefeasible right. But, as we shall have occasion hereafter more fully to remark, unity of possession of the easement and the land over which it comes, is a bar to the running of the twenty years, and the enjoyment during the unity of possession is, in fact, no easement at all, being but the user by the owner of his own property. Besides which, if the purchaser might not build on the land purchased by him from the owner of an adjoining house, for fear of obstructing his light, the land purchased would be less valuable to him on that account, and that would be a consideration which ought to be provided for in the deed of conveyance to him.

* 21 & 22 Vict. c. 27, cited at page 37.

† Cited at page 38.

A proviso has been inserted in some modern Crown leases against the acquirement by the lessees of any right to light or air. It is as follows:—

"Provided always and it is hereby agreed and declared and this demise is made upon the express condition that the lessee his executors administrators and assigns shall not by virtue or in respect of this demise be deemed to have acquired or be entitled to nor shall he or they during the existence of the term hereby granted acquire or become entitled to by length of enjoyment prescription or any other means whatsoever in respect of the hereby demised premises any right of air or light or other easement from or over or affecting any lands or hereditaments belonging to the lessor his heirs or assigns not comprised in this demise. But on the contrary it is agreed and declared that it shall be lawful for the lessors his heirs or assigns and his and their grantees lessees and tenants or any of them at all times hereafter to erect any new building or buildings of any height, or on any land belonging to the lessor his heirs or assigns not included in this demise and to raise to any height or alter any building now existing or to be hereafter erected upon any such land whether any such buildings or alterations shall or may or shall not or may not prevent obstruct or affect in any way the passage of air or light to the premises hereby demised or any part thereof or to any new building which may hereafter be erected upon the land hereby demised."

This proviso is perhaps calculated to prevent a fruitful source of litigation; but lessees should consider, before accepting such a proviso, how seriously the curtailment of their right to the easements of light and air, made possible by it, may affect them.

Unfinished Houses.—It is not a necessary condition to the acquiring of the right to light under the Act of 2 and 3 Will. IV. c. 71* that the house in respect of which light is claimed should be occupied, or even in a finished state, during the twenty years prescribed by the Act for the attainment of the right. If there are windows in the house through which light may pass which would be available for the comfort and enjoyment of the inmates if it were occupied, that is sufficient. This was so held in the case of *"Courtauld v. Legh"* (L.R. 4 Ex. 126) in which Kelly C.B. said: "I am of opinion that no occupation at all, in the sense of personal occupation, is necessary to constitute actual enjoyment within the meaning of the statute. It appears that this house was completed as to its external and internal walls, the roof, and the floorings; and that windows had been put in, capable (as we may suppose) of being opened and shut, and of admitting light. When a house is in that condition, it may properly be said that the owner enjoys the use and access of light to it, and such enjoyment is sufficient to give a prescriptive title under the Act." Channell B., Pigott B., and Cleasby B., concurred in the decision.

Unity of Possession.—Upon the principle that one cannot enjoy an easement coming over land who has that land itself† and upon the further principle that the accruing right to the easement of light is suspended, but only suspended, during unity of possession; it has been held that the twenty years, prescribed by sec. 3 of 2 and 3 Will. IV. c. 71, as the period of enjoyment necessary to give title to the easement of light, must be twenty years during which there has been no unity of possession of the property whose light is sought to be protected, and that over which the easement of light comes; but that it need not have been twenty years' continued enjoyment. *Hatherley L.C.* applied these principles in the case of *"Ladyman v. Grave"* (L.R. 6 Ch. 763), in which he thus illustrated the rule drawn from them; he said, "If it had been shown that the enjoyment had lasted for fifteen years and upwards, and then there had been an interruption by unity of possession, and then the enjoyment had lasted for five years more without the unity of possession, in such a case an enjoyment for twenty years could have been pleaded." His lordship held also that when the plaintiff had shown his right to the easement of light, the

* Cited at page 33.

† An easement is an accommodation or convenience, which one has or claims over the property of another, for the enjoyment of one's own property, such as a right of way, watercourse, light, &c.; so that is evident, from the meaning of the term, that one cannot have an easement over one's own land.

* See particularly *"Smith v. Smith,"* cited at page 49.

ons of proving a unity of possession which destroyed that right rested upon the defendant.

Summary.—We thus have seen that:—

The right to light and the right to air are easements which one man has coming over the property of another to his own; and that these easements are distinct.

Twenty years' enjoyment of the easement of light gives a prescriptive right to it: in the absence of agreement to the contrary.

Obstruction of light, which interferes materially with the comfort and convenience of those affected by it, is an offence which the court is prompt to remedy; but injury to health or other serious effect is considered a necessary ground for the interference of the court in cases of diminution of air.

Possible future damage is now taken into account as well as present damage.

Vendors should reserve to themselves the easement of light when selling land adjoining their house property, in order to secure light to their houses.

The right to the easement of light accrues in respect of unfinished or unoccupied houses, which have windows capable of receiving light during the twenty years of prescription.

There must be no unity of possession of the easement of light and the land over which it comes, during the twenty years' enjoyment of the easement upon which the prescriptive right depends; but unity of possession only suspends the prescription during the unity, and does not destroy or make unavailing the enjoyment of the right before the unity.

Concluding Remarks.—We have thus briefly set before the reader the subject of light and air, and the rights to their use as easements. With regard to light, especially, we may remark that the right to it claimed by various persons upon the removal of old buildings and the erection of new buildings in place of them, has given rise to endless litigation. If the property be large, or affects a large number of surrounding owners, there is almost invariably a dispute about the light: as often as not a dispute raked up for the mere purpose of endeavouring to extort "compensation" by the threat of proceedings. Many writers have adverted to this* and have shown how that owners have had to fight their way to new buildings through expensive litigation: and how, on the other hand, others have spent and lost more in seeking to protect a light than the whole property in respect of which they claimed was worth. Those who find themselves in the position of adviser upon such questions should therefore be more than ordinarily careful; and, we think, should always endeavour to arrange a fair compromise rather than advise litigation. There are well-known instances in which large sacrifices of space have been made in new buildings, because of the right to the light passing through some trumpery little window being set up as a pretext for claiming exorbitant compensation. In all such cases a spirit of liberality should instead be shown: the party whose light will be affected should be willing to receive, and the party proposing to obstruct the light should be willing to pay, a fair equivalent for the light: and it is a disgrace to anything like neighbourliness that so much litigation should be rife as there is in respect of these matters. Easements are so emphatically the concern of neighbours that the law cannot possibly lay down rules which shall comprehend every case: if, therefore, neighbours disagree, they are almost compelled to indulge in litigation and resort to courts of law to have their differences healed. If, however, they are wise, they will be content with a more simple, far less expensive, and eminently good-natured remedy, which is known by the name of "amicable arrangement"; the taking of which they will consequently find to be marked by a saving of time, temper, and money.

Still there are some cases in which litigation must, it would seem, inevitably arise: and we may make a closing suggestion, founded upon the principles of the decisions, as to the evidence to be adduced in support of them. When the obstructive building is already erected, the evidence of persons occupying the premises whose light is obstructed should be obtained, as this will have far greater weight than any scientific theoretical evidence; and the latter will not have

much weight, even though supported by the exhibition of models, compared to the former. But if the buildings are only in course of erection, and there be only a threatened invasion, models should be exhibited to the court, and scientific theoretical evidence given as to the result which would follow from the erection of the proposed buildings.

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WOOD PRESERVING BY CREOSOTE.

IN the proceedings of the Engineers' Club at Philadelphia, some useful observations are recorded on timber creosoting to which we refer. Decay is mainly attributable to the fermentation of the albumen of the sap, which commences when heat and moisture are present; and the aim of all wood-preserving processes is to prevent this fermentation by coagulating the albumen of the sap. Various methods for effecting this, known as the chloride of zinc (Burnettizing); corrosive sublimate or kyanising; sulphate of copper (Boucherie's), and other processes of saturation with metallic solutions may be named; but Mr. E. R. Andrews, of Boston, remarks they only retard decomposition by acting chemically upon the albumen, but they will in time redissolve and be washed out by the rain. They do not protect the fibre itself. On the other hand, Mr. Andrews contends that creosoting does more than metallic salts to coagulate the albumen; it forms a protection to the fibre. Being insoluble in water, the creosote oil enters the pores of the wood and clothes the fibres with an impenetrable coating. Mr. Hayford's process differs essentially from the well-known Bethell's process, inasmuch that the latter can only be applied to seasoned timber, while by the Hayford method green wood is preferred. The reason given by the author for this preference is that the more nearly the condition of timber is to that of a living tree, the sap being withdrawn from the pores, the more readily it will absorb oil. We may quote Mr. Andrews' description of the process here:—"To withdraw the sap and moisture without hardening the fibres is the first step in the Hayford process. This is effected by means of steam, heat, and air-pressure. The wood is loaded on iron cars, and run into a strong iron cylinder which is then hermetically closed. Steam is then pressed through a long coil in the bottom of the cylinder, and also, to a certain extent, free steam is admitted into the cylinder itself. But steam alone would not heat the wood sufficiently to vapourise the sap. . . . To secure a greater degree of heat, by means of a powerful air-pump worked by steam, atmospheric air is pumped into the cylinder until the gauge shows a pressure of 30 or 40 lb. to the square inch. Thus a double result is obtained, i.e., a temperature of 240° to 250°, and also this pressure upon the surface of the wood tends to counteract the tendency of the wood to crack in consequence of expansion of the moisture within. . . . Experience alone will determine when the wood has been subjected to the steaming process long enough to heat the wood to a point when the sap and water will vapourise. Then by closing one set of valves and opening others, the air-pump becomes a vacuum pump, by which the vapours are withdrawn from the cylinder and the wood. The wood parts with its moisture to such an extent, that several hours' work of the pump are needed to produce a vacuum of 24 inches, whereas without steaming the wood, the same vacuum would be reached in half-an-hour." We see from this account that the timber is deprived of all its sap and moisture, and remains in a

vacuum with its pores open ready to imbibe the oil which is now admitted, having been first heated to 200° F. "The oil enters through perforated pipes by which every stick is at once bathed with oil which is rapidly absorbed. When the cylinder is full, the contents are subjected to a pressure of 100 lb. to one square inch until the wood has absorbed the requisite quantity." Mr. Andrews then adduces evidence to show that if the process is thoroughly performed, creosoted wood is practically imperishable. In the Philadelphia and central railroads, creosoted pine ties were laid in the road bed in 1875, and are now in capital condition. In the late railways of Belgium the use of creosoted ties has proved a great success, according to C. Coisue, the superintendent of the creosoting establishment. His figures show that in some cases they have stood from 16 to 21 years in use. To come nearer home, the author quotes the experience of Mr. Harrison, the chief engineer to the North Eastern Railway, who mentions one sample of a Scotch fir sleeper, creosoted, which had been laid down near Tweedmouth in 1858, thus having been 20 years in use. It was an average specimen, and was still in good condition, having been run over by all the trains between London and Edinburgh. The sample showed no indentation under the rail. Against the ravages of the teredo, creosote oil has been long acknowledged a protection to piles and submarine timber work. Various specimens of railway sleepers were exhibited by the author, which had been in use 12 to 20 years, and some blocks that showed a partial riddling which had been submerged in salt water after a portion only had been creosoted. Added to other evidence we have before adduced in this journal, the above experience clearly points to the value of thorough oil impregnation.

TITLES TO LAND.

WE have a pamphlet before us bearing the above title, in which the authors, Messrs. Renton and Co., estate and insurance agents, of Manchester, propose certain well-timed suggestions for the simplification and registration of titles to land. These suggestions are made in view of the reappointment of a Committee by the House of Commons to inquire and report whether any and what steps should be taken with the above object in view, and to facilitate the transfer of and to prevent frauds on purchases and mortgages of land. No one who has had any experience in the purchase of property, whether houses or lands, must not have deplored the unnecessary length of deeds, the prolix narration of covenants and prior-titles, and the unintelligible phraseology employed. One of the suggestions we cordially agree with—it is the cutting short of puzzling descriptions of lands, and the resort to tracings of the Ordnance survey. The author suggests if a certain property came to be conveyed, "the Ordnance survey be referred to, and if it were on too small a scale to show distinctly and with precision the subjects referred to, let the scales be enlarged and a tracing of the subjects laid down on the conveyance. That tracing would not require to be repeated, as we will show hereafter, on any subsequent transaction of the property." It is proposed that in every town or district there should be national or statutory landmarks, or *data* points, so that the chief measurements to be set forth on the tracing would be, say, the distance of the north boundary of No. So-and-So-street, from that mark or point. That distance having been determined, and the point fixed, there could be no question hereafter as to the position of that boundary, and relatively to the other boundaries of the subjects. Thus, all lands by this suggestion would be identified by a tracing or plan made and engrossed on the title. In speaking of covenants or conditions under which land is held, the authors distinguish the cases that occur. They say:—"As to the conditions in existing titles which are repeated *ad nauseam* in every transfer, these may be of the following descriptions:—1. Those which, if not complied with, may either cause the estate to revert to the original grantor or his representatives, or subject the holder in payment of a penalty or liability for damages. 2. Those which have been obviated by other circumstances. 3. Those which infer no penalty if not complied with." In the first of these cases it is observed to be quite unnecessary to engross these conditions in every transfer,

* See particularly the finely written preface by the late David Gibbons to the fifth edition of "Gale on Easements," edited by him.

but "that a proper reference be made to them in the transfer, as they are set forth in the title which created them, and in that way they will be incorporated in the transfer, and binding." If the title be in a dilapidated state, a true copy made of it, and attested and referred to, that will serve once for all. These two suggestions, if adopted, would, we consider, wonderfully shorten transfers, and confer a lasting boon on granters and grantees. We have no space here to allude to the other covenants under which real estate may be conveyed to new holders, though, as the authors justly contend, it is absurd that in every building estate being laid out every title to a separate lot of ground—it may be a hundred—be set forth *ad longam*, when the conditions may be the same, or different only in one or two special cases. Of course, it is necessary to have general conditions prepared by the proprietor of the estate, which should be made the basis for grants of title. If altered conditions are to be introduced in the title these can be set forth as exceptional; but it certainly seems ridiculous to repeat those common and general conditions which universally apply. The best mode unquestionably would be to make such general conditions statutory, under which all titles would be granted. A similar mode may be adopted with mortgages. The authors give various forms for transfers of land under particular conditions, and to these, and other suggestions as to registration, we have much pleasure in referring our readers who are interested in divesting legal documents of their present complexity and cost. The machinery of the law is still most cumbersome, and Messrs. Renton will have done some good if, by the timely publication of their suggestions, a simplification of titles can be procured.

COMPETITIONS.

CITY OF LONDON SCHOOLS.—The designs for the new school buildings which are to be erected on the Thames Embankment are still under consideration, and, notwithstanding the Easter recess, the Court has been actively engaged in examining the several plans. We understand that the members are much pleased with several of the plans submitted, and that an award may speedily be looked for. No professional referee has as yet been retained, though possibly the Court may seek professional confirmation of their decision. It is a question yet to be determined as to whether the competition plans will be exhibited or not. We hope both the latter proposals will be carried out, in common fairness to the competitors.

HALIFAX.—The Halifax School Board have decided not to adopt any of the plans submitted in competition for the new higher Board School, none being considered of sufficient merit. This result has been arrived at after calling in Mr. Robson, the architect of the London School Board, to report on the plans.

IPSWICH PUBLIC HALL COMPETITION.—Last week we mentioned the result of the competition for the alteration of the Public Hall, Ipswich, which has given rise to some discussion. Having seen the plans sent in, under the motto "Tria Juneta in Uno," by Mr. H. Cheston, of London, and also the hall in Westgate-street, we are in a better position to speak of the practicability of the scheme. The present hall is a brick-built structure 98 feet long by 50 wide, with a recess for orchestra at one end, and a gallery at the entrance end, which returns for a short distance in a curvilinear form round the sides. The walls are relieved by pilasters, above which is a series of clerestory or lunette lights that pierce the coved ceiling and form groined pendentives between. These admit the light. The flat portion of ceiling is relieved by elliptical-shaped panels, which were formerly intended to be glazed. Mr. Cheston's premiated plan shows an extension southward, making the hall 151 feet long, and the removal of the saloon and other apartments in the rear. He forms an elliptical alcove or recess at the end, and fills the present panels in the ceiling with glazed lanterns. The question is whether this extension, at an estimated cost of £4,500, is the best means of providing for the requirements of the Corn Exchange; in other words, whether the expenditure of this sum will give the town what it wants, equally well with a more costly proposal of building a new Corn Exchange, at the cost of £24,000 on another site. Of course

there are two considerations in such a question, one of means, and the other of efficiency; but we are disposed to think, from an examination of the plan, that the hall will be spoilt for public audiences by the disproportionate length of the room, and also that a wider and more concentrated area would be better secured for a Corn exchange. Unless the hall can be widened as well as lengthened, we are afraid the building will assume the character of a gallery—a kind of *tertium quid* not to be desired.

KENILWORTH.—The first premium of £50 has been awarded by the Local Board of *Kenilworth*, not Cardiff, as stated by us last week, to Mr. G. A. Lundie, M.I.C.E., for his scheme for the sewerage of the town. It is proposed to deal with the sewage on eight acres of land by intermittent downward filtration, and the whole of the works are estimated to cost about £5,000. The Local Board advertised for plans, specifications, and tenders, and there were twenty competitors.

SCHOOLS OF ART.

GLOUCESTER SCIENCE AND ART SOCIETY.—The annual report of this society states that during the past year a piece of garden ground on the north side of the schools has been purchased for £750, in view of a possible extension of the institution, and also to prevent the erection of objectionable buildings close to the schools. The work of the Science school commenced on October 10th, 1877. Four students were enrolled, and 52 presented themselves for examination. The results were hardly so good as last year, though as this appears to be the case throughout the country, it may be assumed that the standard of examination has been raised. In the Art school 229 students attended the various classes throughout the year. 559 works in various stages by 78 students were sent to South Kensington in April for examination. In the National Competition the school obtained one bronze medal and two book prizes. In the advanced Art examination, held in June last, out of 54 candidates 5 were successful, and 3 received prizes.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

GLASGOW ARCHITECTURAL ASSOCIATION.—The opening meeting of the second session of this association was held last week. Mr. James Sellars, I.A., hon. president, who entertained the members, received them in the entrance hall, where the drawings which have been submitted in competition for the gold medal and president's prize given by the Glasgow Institute of Architects were exhibited. Later on in the evening the ordinary meeting of the association was held—Mr. James B. Stewart, president, in the chair. Mr. Sellars addressed the meeting. He urged continued application to the study of the profession they had chosen, and offered some practical advice as to the best means for realising the objects the association had in view for the benefit of its members. He intimated his intention of giving a prize for the best design for a cottage, with specification, to be competed for by the members of the association. Mr. Sellars concluded as follows:—"All of you must know that the mere regular performance of ordinary office work for a given number of hours per day is not sufficient to make you accomplished architects. You must have that enthusiasm for your art which will keep its pursuit constantly before your mind; you must have that devotion and love for it which will engender an ever-increasing desire for more knowledge of its subtleties—an ever-growing wish to emulate the immortal works of those who have gone before you—or your chances of rising out of the rut in the great race for distinction are but feeble indeed. In our profession a position is not to be made without hard, earnest, enthusiastic work. But while all this is true, I know of no profession in which there is more pleasure to be obtained. To the earnest, painstaking architect, who has thrown his whole mind into his work, who has faithfully studied its every detail, what greater happiness can there be than to see the fruit of his thoughts embodied in enduring stone, destined, it may be, to influence and to give a direction to the taste of a whole community, and to hand his name down with honour to posterity?" Mr. Mossman then addressed the meeting. He referred to the relations of architecture with the sister arts,

remarking that the art of the best periods was always characterised by a strict adherence to architectonic principles. He concluded by offering a prize for designs of a vase with figure subjects. The customary votes of thanks terminated the proceedings.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—At the usual monthly meeting of this Society held this week, a notice of an ancient Scottish lectern, now in the parish church of St. Stephen, St. Alban's, Hertfordshire, was read by Mr. William Galloway, architect, Corr. Mem. S.A. Scot. Apart from any conjectures as to its history, this lectern is of special interest as being the only known example formerly pertaining to Scotland which has escaped the disastrous issues of civil and religious commotions. Its history is very singular. About the year 1750, when a grave was being dug in the chancel of St. Stephen's church, the lectern was found buried in the soil. It is supposed to have been thus concealed at some time during the Civil Wars. It is of cast brass, and of a handsome design, consisting of an eagle with expanded wings supported by a shaft decorated with several groups of mouldings, partly circular and partly hexagonal. The eagle stands upon a globe, and the shaft has been originally supported on three feet, which are now gone. In its present state the lectern is 5 feet 7 inches in total height. It bears the inscription—Georgius Creichtoun, Episcopus Dunkeldensis. He died 24th January, 1543, and previous to his elevation to the see of Dunkeld he had been Abbot of Holyrood. The probability, therefore, is that the lectern had been presented to Holyrood by the Abbot on his elevation to the see of Dunkeld, and that it was taken from Holyrood by Sir Richard Fea of Sopwell, who accompanied the Earl of Hertford in his invasion of Scotland in 1543. On his return Sir Richard presented to the parish church of St. Alban's a brazen font bearing a magniloquent inscription, to the effect that though previously designed for the baptism only of the children of kings, it now, in gratitude for its rescue from the fire which consumed Edinburgh and Leith, performed the same service for the meanest of the English. This font, which was doubtless abstracted from Holyrood, is no longer known to exist, and there seems no reason to doubt that the lectern which was saved by being buried during the Civil Wars, was abstracted at the same time, and given to the parish church of St. Alban's by the donor of the font. Mr. Galloway concluded his paper by urging the Society to take some steps to have this interesting relic restored to Scotland. Drawings of the lectern were exhibited. The next paper, also by Mr. Galloway, was a notice of a sculptured stone in the old churchyard of Tullihole, Kinross-shire.

CHIPS.

New schools have been completed for the Thetford School Board, and are to be opened early in May. Mr. J. B. Pearce, of Norwich, is the architect, and Mr. Bardell is the contractor.

A new Calvinistic Methodist Chapel is about to be built at North Risca, South Wales. Messrs. James and Bevan are the contractors, and the architect is the Rev. A. Davis, of Rhymney.

The organ recently purchased for the Wesleyan Chapel, Lewes, was opened on Sunday week after repairs by Mr. Starnes, of Lewes. The instrument was built by Snetzler in 1751, and is one of the many respecting which the tradition exists that Handel used frequently to play upon it.

Mr. Armstead will contribute to the Royal Academy a recumbent tomb-statue in marble of the late Archdeacon Moore, to be erected in Lichfield Cathedral, near the similar memorial by the same sculptor of Dean Howard.

A cocoa house was opened on Friday in the Market-place, Wednesbury. The alterations were carried out by Mr. George Morris, of School-street, in the same town.

At a ratepayers' meeting at Llandilo-fawr held on Thursday, the 3rd inst., it was decided to take steps for raising and restoring the tower of the parish church, and placing therein a town clock. A committee was appointed to act in the matter.

The failure of Mr. Edwin Clark, civil engineer and contractor, was announced in the London Bankruptcy Court on Monday week. The liabilities are set down at £760,000.

The Brighton School Board have instructed the surveyor to prepare plans for proposed new schools at Preston.

The Masonic Hall, Dorchester, has just been re-decorated, &c., by Mr. Gould, of that town.

Building Intelligence.

BELFAST.—New schools have been erected in North Howard-street, Belfast, by Miss Charters as a memorial of her father. The buildings comprise on the ground floor a boys' and girls' school, infants' school, with classroom, cloak-rooms, &c. On the first floor is placed a hall for instruction in cookery to accommodate 120 persons. The main entrance from North Howard-street is placed under the tower, and has deeply moulded joints, from which springs a Tudor arch with a flat label moulding, on which is placed a datestone with pediment and scroll-work. All the external walling is of Scrabo sandstone, with the dressings of windows and doors neatly tooled. The gables are coped with stone moulded barges, and have kneelers and summits finished with stone terminals. The style adopted is a modification of that prevalent in the seventeenth century. Messrs. H. and J. Martin were the contractors. The buildings have been erected from the plans and under the superintendence of Messrs. Young and Mackenzie, and the total cost is about £2,500.

BERRY POMEROY.—The parish church of St. Mary, Berry Pomeroy, Totnes, South Devon, has undergone thorough restoration. The north transept chapel has been carefully cleaned, as also the Star-tomb, which is supposed to contain the remains of Sir Richard Pomeroy, who rebuilt the church in the latter part of the Fifteenth Century, when the south aisle was added. The chancel has been laid with encaustic tiles, and the new altar, which is of massive carved oak, is reached by three stone steps, along the second of which are placed elaborately-traceried rails, also of oak. A stone sedilia has been placed on the south side. A new oak pulpit, on a plain pedestal of Bath stone, is situated on the north-east side of the nave, and a lectern has been presented. The celebrated carved and illuminated screen has been carefully treated; and the removal of some old pews, and a quantity of dirt and varnish, has revealed a number of panels on which are paintings of saints and the four doctors of the Western Church. This screen has formed the basis upon which the whole of the architectural features of the church have been renovated, and where it had decayed or become mutilated, well-seasoned oak has been re-inserted, and now it stands almost as perfect as when it was first constructed. The nave and aisles have been re-seated. The columns, which were from thirteen to eighteen inches out of perpendicular, have been restored to their original positions, and each one has been thoroughly cleaned, the result being that an inscription was discovered on each of the capitals. Eleven new windows, of five lights each, with tracery, have been inserted, and the east window has been lowered to correspond with that at the western end. The floor is inlaid with Minton's tiles. The cost of the restoration is £3,000, and it has been carried out under the superintendence of Mr. Jeffery Michelmores, architect.

DIXON GREEN.—The new Church of St. Thomas, at Dixon Green, near Farnworth, was consecrated on Easter Monday. The church is in the Early English style, built of Yorkshire stone, and is plain but substantial. Internally it consists of nave and chancel, having a total length of 139 feet, and is capable of accommodating some 630 persons. It has cost about £8,000. Mr. J. S. Rawson, of King-street, Manchester, was the architect.

ECLES.—The new church of St. Andrew, Eccles, was consecrated on Wednesday. The designs were prepared by Mr. H. E. Tijou, of Manchester. The length of the building, which will seat 800 persons, is 126ft. 6in. by 55ft.; the height is 60ft. It is built of Durnford Bridge parpints, with dressings of Storton Park stone. The cost of the building is £8,000, but the tower is incomplete, and it is not intended to proceed with it at present.

HARROGATE.—The new chapel erected by the Wesleyan Methodists at Harrogate was opened last week. The building is in the Early Decorated style. The outer wall stones have been supplied from the Killinghall quarry, and the ashlar dressings from Leeds. The chapel possesses a nave, two transepts, and a chancel. The walls are finished in plaster. The chapel is heated by hot water, and Messrs. T. and R. Boote, of Burslem, supplied the tile work. The

cost of the building is estimated at £10,000, and it will accommodate about 750. It is expected that when the spire is erected it will augment the expenditure to upwards of £11,000. All the work has been carried out under the superintendence of the architect, Mr. George Woodhouse, of Bolton-le-Moors.

MELBOURNE.—The Wilson Hall of the Melbourne University, now in course of construction, is the gift of Sir Samuel Wilson, who is a member of the Upper House of Parliament in Victoria and a wealthy landowner, to the University of Melbourne. It is now about four years ago that, actuated by feelings of liberal gratitude to a colony that had handsomely responded to his own energy, he conceived the idea of presenting the colony with a testimonial of his feelings and worthy of acceptance. The want of an examination-hall at the university was greatly felt, and to remedy this inconvenience Sir Samuel Wilson conceived the idea of presenting a sum of money sufficient to build a hall worthy of the institution, to be used for great academical ceremonies. Messrs. Reed and Barnes, the architects of the university, were instructed to prepare the necessary designs and drawings, and to call for tenders for the work. The lowest tender was £36,707 10s. 6d. from Messrs. Nation and Co., builders, Melbourne, and the work is now in active progress. The style of the building is Gothic of the Perpendicular Period. The walls, which stand on a plinth of blue basaltic stone, are of freestone. The exterior face is of sandstone of a good quality, and the interior of a limestone very similar in quality and colour to the French Caen stone. The roof is an open timber one of elaborate design, resting on stone corbels, and covered with slates. It is surmounted with a ventilating lantern, and furnished with ventilating gables. The hall is divided into bays, a larger one forming the dais; the total internal length is 140ft., and the width 47ft. The height of the walls from the ground is 55ft., and the height of the roof 87ft. The bays are divided externally by buttresses surmounted by pinnacles, and each side bay is lighted by a three-light window. The dais is lighted by two large bay windows, that on the east side being octangular in form, and that looking into the quadrangle rectangular. The main entrance is in the north end, and consists of the three doorways shown in the drawing. They open into an entrance-lobby, which is connected with the present university building by a corridor. There is also a side entrance in the western bay window leading into the quadrangle. Above the entrance-door internally is the large archway of the organ gallery; in connection with this gallery is the block of buildings which is designed to connect the new hall with the present building. It contains the rooms necessary for instruction in music whenever a professor of that art may be appointed. The hall is placed at the south-east angle of the present building, and is to be connected with it by the block of buildings above mentioned, the whole forming an extension of the east side of an open quadrangle.

MELBOURNE.—New offices for the proprietors of *The Age*, *The Leader*, and *The Illustrated Australian News* newspapers have been erected in Collins-street East, Melbourne. The new offices consist of five floors, and were erected from designs prepared by Messrs. Reed and Barnes, architects, of Melbourne, the front elevation being of the Corinthian order. The foundations and basement story are very strongly constructed of bluestone and brickwork, the latter being twenty-seven inches thick. The ground floor, which is approached from the street by a flight of stone steps, is devoted chiefly to the general offices, and the publisher's room; the former being thirty-six feet by twenty-one feet, and the latter thirty by twenty-six. The fittings are of cedar. On the first floor are situated the rooms devoted to the use of the proprietors, editors, and sub-editors. Immediately over the literary department, on the second floor, are the composing and stereotyping rooms. The third floor covers about the front half of the composing-rooms, and is given over to the use of the artists and engravers. The cost of the building and plant was about £20,000.

NEWPORT.—Memorial stones of a new Bible Christian chapel were laid at Newport, Isle of Wight, on April 8. The chapel is being built from the designs of Mr. Frederick Mow, architect, of London. The style of architecture is

Gothic. The roof will be opened-timbered, of handsome design, and the chapel will be terminated with an octagon-shaped organ gallery—behind the rostrum—inclosed by a badly-recessed arch. Behind the chapel, in addition to the schoolroom—53ft. long and 21ft. wide—there will be vestries for the ministers and stewards, and kitchen on the ground floor, and class and retiring rooms on the gallery level. The chapel will afford accommodation for about 600. The builder is Mr. Isaac Barton, of Ryde. The cost will reach £5,000.

QUEENSTOWN DEEP-WATER QUAY.—This work, owing to the energy of the contractor, Mr. John Delany, of Cork, who has lately completed his preliminary arrangements, which were necessarily tedious and expensive, is now progressing in a most satisfactory manner; the large concrete blocks, weighing over 100 tons, are being rapidly made at White Point, at which place they will be lifted by means of a powerful floating shears, conveyed to the site of the quay, and lowered into position at a depth of twenty-six feet below low-water mark. Large quantities of material being ready for use on the spot will insure, during the summer months, rapid progress in the work, the completion of which will be of immense advantage to so important a point as Queenstown.

RADSTOCK.—On Tuesday, the church of St. Nicholas, Radstock, was re-opened, after having been restored and enlarged. Mr. Wilcox, of the firm of Messrs. Wilson, Wilcox, and Wilson, architects, of Bath, prepared designs, and from his drawings the affair has been carried out at an expenditure of about £2,550, by Messrs. Wall and Hook, of Brimscombe. The old chancel was taken down and the whole east end of the building cleared away. The church was then extended about 30ft. eastward, and an entirely new chancel constructed. The galleries, which were very unsightly, were removed, new roofs formed, and an organ chamber and vestry built. The style adopted in the original church—Early Decorated—has been adhered to, and such portions of the structure as could be utilised were allowed to stand, so that a portion of the south wall, the porch, and west end remain. The tower was untouched, except that the internal arch is restored. The new structure will seat 113 additional worshippers, besides those who could have been accommodated in the galleries, and altogether there is room for 520 persons in the church.

ST. BARTHOLOMEW'S HOSPITAL.—An addition to St. Bartholomew's Hospital is in course of construction, consisting of a library, practical classroom, museum, lift-rooms, and offices. The frontage to Giltspur-street displays a Classic elevation. The base is composed of Dalbeattie granite, and is 7 feet 6 inches in height. The upper portions consist of Portland stone, with intermediate Aberdeen polished granite panels sunk and moulded. The principal room in the interior is the Turnerian museum, 26 feet 6 inches by 96 feet 6 inches. The height is 26 feet from the floor to plate of roof, and 15 feet from plate of the roof to ceiling. The lighting is effected by a skylight and lantern-light. The staircase to the offices is of Dalbeattie granite. The grand staircase, as well as all the internal stairs, are composed of choice Craigleith stone. The material used in the construction of the offices and lift-rooms is white glazed brick facings, supplied by the Farnley Iron Company, near Leeds. The building has an iron span roof by Messrs. Moreland and Son, who also furnish the girders. The architect is Mr. Edward T'Anson, Laurence Pountney-hill; the contractor, Mr. Deputy Brass, Old-street; the clerk of works, Mr. G. Streeter; and the builders' foreman, Mr. A. J. Pearce.

ST. GILES'S CATHEDRAL, EDINBURGH.—The work of restoring the southern section of St. Giles's Cathedral, Edinburgh, has been in progress during the past two months. The first thing done in the way of restoration was to clear out the Chapman aisle, which is immediately east of the south transept. The restoration committee were surprised by not finding in that aisle the remains of the Marquis of Montrose, which, according to tradition, were interred there in 1661. It was conjectured that they would be found in one of the vaults. As it would be satisfactory to have this point as well as some other points cleared up, an exploration of the vaults was made on Thursday week, and Dr. William Chambers, chairman of the restora-

tion committee, has reported. No discovery was made of the coffins of the Earl of Murray, the Earl of Athole, the Earl of Montrose, or the Marquis of Montrose. Some further examinations will be made, but it is not likely that there will be any fresh discovery. In short, it would appear as if the bones of the great marquis had vanished. It is expected that the restoration of the southern section of the building will be completed in the summer of 1880. The expense is estimated at £1,500.

SNAILWELL.—The parish church of Snailwell, which from dirt, decay and neglect had become utterly unfit for use, was reopened on Easter Sunday after restoration from the designs of Mr. R. Reynolds Rowe, F.S.A., of Cambridge. The roofs have been re-slatted, the walls and masonry cleansed and repaired, and the south aisle and porch have been rebuilt. The chancel, which was whitewashed outside and propped up by miserable brick supports, has now an exterior of flints and wrought stone; the fittings have been replaced by others more in character with the church, and all the windows have been filled with stained glass. The steps are of rubbed Mansfield stone, and the floors of rich tiles, and the patron has presented a reredos of stone and alabaster. The church is seated with oak throughout. A stone pulpit has been built close to the north-west side of chancel arch. Of the new stained-glass windows, one is by Mr. Constable, of Cambridge, and the other ten are by Messrs. Cameron, of Duke-street, Manchester.

STOURBRIDGE.—The new cemetery at Stourbridge was consecrated on Monday week. The Board have borrowed £7,500 to meet the cost of the cemetery, of which the ground cost £1,123, and the tenants' interest in it £120. The contract for the two chapels and lodge amounted to £2,500. The cemetery consists of eleven acres or thereabouts, a little over four acres and three roods having been allotted for consecration. The grounds have been laid out and the buildings designed by Mr. Smalman Smith, architect to the Board, the previous designs sent in competition having been set aside. The chapels are cruciform in plan, the consecrated portion being on the east and the unconsecrated portion on the west, of a central tower with entrance and exit portals. There are two vestries and a crypt. The spire is 100ft. in height, and is covered with English oak cleft shingles. A portion of the interior is lined with brown and white stone. The chapels, lodge, and inclosure walls have been built with brown stone, the gift of Mr. J. Amplett, of Clent, and 6,452 tons of this material have been used. Bath and Grinsell white stone are used for the dressings and weatherings. The style of decoration is that of the Geometric period. Mr. S. Guest is the contractor for the chapels and lodge.

WISBECH.—The new schools for girls and infants at Elm-road, Wisbech, have been opened this week. The elevations as seen from the Elm-road are of the Early Pointed period, and built of white bricks and stone. The north-west elevation has a bell tower terminating with a spire carried by shafts of Mansfield stone with foliated capitals. The school for girls is 5ft. long and 20ft. wide, and two class rooms each 20ft. and 18ft. wide, capable of accommodating 200 girls. The school for infants is 39ft. long and 20ft. wide, with gallery and a class-room 20ft. and 18ft. wide, capable of accommodating 150 infants. The entrance to the schools is 20ft. by 18ft., to be used for a cloak room. The work has been carried out by Mr. Henry Farrow, builder, from plans and under the directions of Messrs. Adams and Son, architects, Wisbech and Lynn.

The Shropshire magistrates received at the quarter sessions last week a report from Messrs. Martin and Chamberlain, architects, of Birmingham, with reference to providing additional lunatic accommodation. The report was in favour of enlarging the present joint asylum at Bieton by 200 beds, of which it is quite capable, in preference to building another elsewhere. The consideration of the question has been adjourned till July.

The *Isle of Man Times* complains of the slow progress of the Battery works at Douglas. The work is being carried on for the House of Keys under the superintendence of Mr. Powell, who receives, so this journal states, a salary of £1,200 per year while the work proceeds. The battery was expected to have been completed at the close of 1878.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—J. L. A.—J. B. and Son.—S. L. B.—B. of T. W. G. H.—J. A. and Son.—C. Bros.—J. T. W. Z. (Yes; full reports have appeared in recent numbers of the ENGLISH MECHANIC).—BROSELEY. (Stanford's patent joint is manufactured by Messrs. Doulton and Co., of Lambeth).

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—Nemo.—J. J. C.

CORVUS (the scale for village school chapel is of course intended to be 1/4in. scale).

The following drawings came too late for review:—Omega, Triangle in Circle, Try Again, Be Mindful, and Amphion. We shall refer to these designs next week.

Correspondence.

THE SOCIETY FOR THE PROTECTION OF ANCIENT BUILDINGS.

To the Editor of the BUILDING NEWS.

SIR,—As there seems to be an impression growing up in the mind of the public that the above society is actuated by feelings of disregard for the structural preservation of ancient buildings, and as such an impression is likely to seriously interfere with the important objects which they have in view, I have been requested by the committee of the society to ask you to insert their most emphatic denial of any such sentiment on their part. The urging on the public of the necessity of doing structural repairs to ancient buildings in time to prevent decay and keep out wind and weather is one of the primary objects of the society, and they have on several occasions had to deplore in the cases of ancient buildings brought under their notice that money which ought to have been expended on the structural repairs have been worse than wasted in utterly destroying the beauty and historical value of the interiors.—I am, &c., WILLIAM MORRIS, Hon. Sec. 9, Buckingham-street, Strand, W.C., April 8th, 1879.

A UNIVERSAL DICTIONARY FOR ARCHITECTS.

SIR,—In the notice which appeared in your issue of April 4 of a Universal Dictionary for Architects, &c., of which I am the author, you state that "the

assumption in the preface that 'excepting the Dictionary of Architecture there is no book which exclusively contains in alphabetical order a fair approach to a complete repertory of architectural and building artificers' phraseology' is inaccurate." I say in my preface that "excepting the Dictionary of Architecture there is no book which exclusively contains in alphabetical order a fair approach to a complete repertory of architectural and building artificers' phraseology and terms." Now, I maintain that, with the exception named, there is no such book—of course I mean published in the United Kingdom—and from the nature of my investigations, for some time past, I consider that I am fully competent to decide on the point.—I am, &c., April 8th. WYVILL JAMES CHRISTY.

Intercommunication.

QUESTIONS.

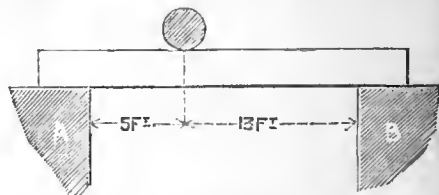
[5733].—**A Six-roomed Two-Story House.**—I shall feel very grateful to any reader of your journal who will inform me where I can get a book or in what number of BUILDING NEWS I may be able to glean some information in wooden structures, also difference in cost of wood and concrete building? Also the kind of wood best adapted to stand exposure in the outer wall, and if there is not a better and more durable way of building with wood than frame partitions and weather boarding? I purposed making the outer wall of solid 9 x 3 deals, covering the inside with hair felt, and fixing 1in. wrot deal lining as a finish in lieu of plaster, making all main angles, window and door frames and plates 6in. x 6in.—**A POOR COTTAGE, Far West.**

[5734].—**Resin-and-Beeswax Jointing for Brickwork.**—In a biographical notice of Earl Beaconsfield in *Mayfair*, entitled "The Biggest Ben," occurs the following:—"One very curious circumstance should not be forgotten. The house referred to above as that in which Benjamin Disraeli the first 'ate macaroni dressed by the Venetian Consul' was in existence until within a very recent period. It was one of the finest specimens of Jacobean architecture extant. The bricks were of the best quality; they were ground down to a true surface, and instead of being cemented with mortar in the usual way were brought together with a mixture of resin and beeswax. In the terra-cotta thus formed, carvings of no small beauty were executed." Can any of your readers supply any more detailed account of the process, and state whether it is one which is suitable for present workmanship?—Q.

[5735].—**Australia.**—Could any of your readers kindly give any information about architects' assistants in Melbourne or Sydney? What chances they have and what salary they get. Any information will be thankfully received.—S. B.

[5736].—**Softening Plaster of Paris.**—I have a delicate marble structure to remove and re-erect. Will some experienced reader kindly say the best way of softening the plaster, separating the pieces and cleaning down when finished?—A CONSTANT READER.

[5737].—**Load on Beam.**—Would one of your numerous readers give me a simple rule to find the following:—A beam supported at both ends and loaded at a single point; determine the proportion of the load borne at A and B respectively? Also how the constant for fir is



found or derived?—CAVENDO TUTUS.

[5738].—**Attics.**—Will someone kindly recommend from experience a good non-conducting substance with which to line the inside of an attic roof exposed to the sun? The attic is open to the slates, and well ventilated.—W. B. D.

[5739].—**Sewage Way Leave.**—The question of price to be paid for increased size of main sewers having been agreed, the one of way leave now is a debatable point, and a very important one, too, so much so as to nearly upset all past arrangements. Any information from your readers would greatly oblige as to what has been paid for way leave per mile, or how?—R.

[5740].—**English, French, and German Architectural Dictionary.**—Can any reader inform the inquirer whether there is a "Dictionary of Terms in Architecture and Building Construction" translated from English into French and German.—CORVUS.

[5741].—**Shop-Front Work.**—Will some fellow-reader give me the benefit of their experience in shop-front work—viz., is it advisable, when erecting shop-fronts, with brick building over, to build on the front girder (a fifth one) until it begins to deflect, before putting the iron columns under it, or is it best to fix the column before building on girder at all?—CONSTANT READER.

[5742].—**Drainage.**—Will some reader of your paper inform me what the law is with reference to owners of houses draining into sewers put in the public roads and streets by the local authorities where the local rates are already levied? Whether the local authorities are compelled to bring the drain to a person's premises, or whether the owners have to pay for the drain outside their premises so as to connect it with the sewer, no matter what distance or depth in the public road or street it may be laid.—A. C.

[5743].—**Responsibility for Quantities.**—I shall be glad if some of your (quantity surveyors) readers would kindly give me their opinions of the following queries: Has an architect a legal right to make arrangements with the quantity surveyor whereby he receives for himself half the commission without his having done any portion of the work in preparing the quantities? Can he do so and retain a honest position with his client? Assuming the quantities turn out deficient, does he not compromise his position as independent arbitrator in giving his final certificate under the usual clause in contract that it shall be binding on both parties? When the commission is so divided, who is responsible for deficiency of the quantities?—C. A. H.

[5744].—**Removing Grease from Photographs.** Can any reader recommend a sure method of removing lamp-oil marks from photographs without damaging the same? Hot iron and benzine have been tried without success.—M. E. S.

REPLIES.

[5699].—**Driving Sewer Headings.**—To get the dirt out of heading in long distances requires more headroom than short distances. Have a small trolley long enough to hold two skips, one to be landed on trolley whilst the other is sent up shaft—say, in a temporary road with temporary rails or some quartering, with hoop iron on top to prevent the wheels of the trolley from wearing the timber. In filling heading there is no difficulty. Put dirt back in heading and pun it. There is no trouble in getting timber out in moderately good ground. Remove some of the side piling boards first, then the props, then fill up as closely as possible to head tree before removing it.—JOHN T. WELCH, Contractor, Tiverton-on-Avon, Bath.

[5709].—**Perspective.**—In determining the arrangement of lines for an interior perspective, it would be unwise to trammel oneself at the commencement by an endeavour to adhere to a fixed or predetermined number of degrees to be exactly contained in what might not be inaptly called the angle of observation. What is necessary to observe is that such does not exceed 60°, such to include the whole of the picture plane, so far as the horizontal angle is concerned. The degrees in the vertical angle of observation are not usually considered, nor can it be necessary to do so as we are not compelled to cast our eye to the nearest point in the ridge, but the picture requires the roof completed as a rule. In the diagram sent, suppose Fig. 2 2 2 2 to be a church plan taken clear of openings for the purpose of simplicity in illustrating. Let

some special purpose, and to be seen from the distance K P, then A B would be the picture plane, and the lines A P and B P would contain the angle of horizontal observation, being much less than 60°, and K 1 will be the projection of the centre of the east end. Case 2. We could make C D the picture plane still containing less than 60°, and where K 2 will be the projection of K. Likewise may E P, G H, and I J each be made a picture plane, when in the latter K 5 will be the projection of K, and L will in any picture plane nearer the spectator have its projection in the radial line I P. Likewise M in M P, N in N P, and O in O P. Now if angle I P J be measured with a protractor it will be found to contain—say, 60°, and therefore we cannot adopt a picture plane nearer to the point of sight. Then, supposing that we have drawn a perspective on picture plane I J, we could, with a pair of compasses, clip it round its edges so as to become identically the same as the perspective on line G H, and repeat the operation successively for any imaginary number of picture planes drawn parallel to and within I J, and when we should have a complete perspective left, whence it is manifest that a perspective may be drawn with a pyramid of rays, having for its oblique base the section of the interior of the church depicted, and its side which lies on plan not exceeding 60°, but may be less. Finally, with respect to the necessity for the picture plane to be parallel with the east end wall—i.e., at right angles with the axial plane. In our method we have assumed it is always to be so, but many artists don't draw it parallel, and then per necessity all their transversal lines must tend to a vanishing point, not being the point of sight, but in parallel perspective. There is but one vanishing point which is the point of sight, and they are then therefore drawing in oblique perspective and correct in every particular; but by some persons conventional parallel perspective—i.e., with the point of sight without the axial plane—is preferred, although such really is slightly oblique perspective, ignoring one vanishing point and calling the other one the point of sight. True parallel perspective would give an artistic picture with little else but monotony, and at variance with perhaps the first fundamental axiom of all artists—viz., that the point of sight should be to the right or left of the centre of the intended picture. Oblique perspective for an interior will at once prohibit any transversal arcs from being drawn with the compasses. All such would then become elliptical curves in perspective, and would require very much extra time to project them correctly, and then they would not look so well as geometrical arcs drawn from centres. Hence, perhaps, is the principal reason why conventional parallel perspective is preferred—i.e., to save work and gain effect though nothing can equal a good photograph which, if not taken in the centre, must be in oblique perspective, and in such every curve must be correctly projected; and it would be an instructive exercise for anyone having the time to spare to draw a perspective of an interior of a large church on the oblique system to a large scale, and get some church photographed from exactly the same point of sight, height also to an inch, and then get the drawn perspective reduced to exactly the size of the photo by photolithography, and then carefully trace same and make another tracing of the leading lines of photograph and then place one tracing over the other and see the difference. Also might the large drawn perspective be shaded according to the intelligence of the artist, especially with respect to how the light will fall on circular and octagonal Gothic capitals and reduced to the size of photograph and compared, and some startling discoveries might then be made.—HENRY AMBROSE.

[5725].—**Substitute for Mortar.**—If "A. S." desires a stuccoed surface, Portland cement and good clean sharp sand, free from saline impurities, in the proportion of 1 to 2 is the best substitute to use. Francis's cement is reliable. Lime and river sand are the worst possible kind of protection in an exposed or damp situation.—G. H.

[5726].—**Breaking Weight of Girders.**—In the first case mentioned by S. W. Leeds, the useful formula for flanged joists may be taken, or, $W = 7 \frac{ad}{L}$ in which

a = area of bottom flange up to the top of rounded angles, d = depth in inches, L length in feet, and W = breaking weight in tons. In this case the extra plate produces no additional strength worth notice, as the lower flange takes the principal strain. 2. When a plate is added to the top and bottom, I should simply take the additional sectional area of the plate added to lower the flange. In the case of 3, I am not aware of any experiments upon which a reliable formula can be based. The only rational method of considering two such girders united by top and bottom plates is to use the same formula, adopting a slightly lower multiplicity, treating the girder as a box girder. The tables, published by Measures Bros., Rowson, Drew, and Co., Henderson, and other rolled girder establishments, may be obtained for such combinations, and are, as a rule, reliable.—G. H. G.

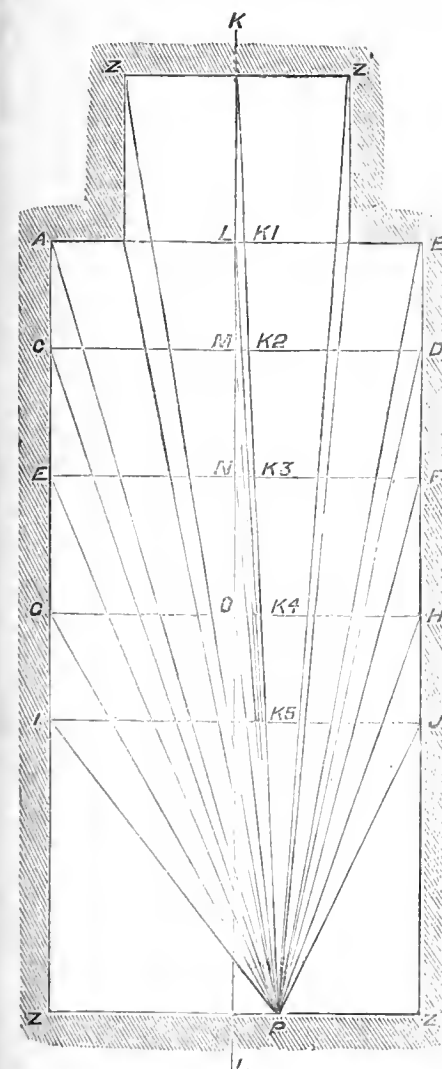
[5726].—**Breaking Weight of Girders.**—In reply to T. W. Leeds, the best formulae for rolled joists having a plate on the top would be those derived by the average strength of numerous examples from different makers, and not made with a view to their being tested. Perhaps such has not as yet been accomplished, and if not we may arrive at some conclusions more or less trustworthy by considering the known strength of the material and the mechanical nature of the strains to which in such cases it will be subjected. Let us suppose that wrought iron girders could be made in one piece and without rivets, then let us consider the actual strength of the material when subjected to a direct strain, neither multiplied nor diminished by mechanical agency. First let us take tensile strength. It is generally conceded that sound wrought iron of a good quality may safely be subjected to a strain of 5 tons per inch. With respect to the compression of wrought iron its strength is slightly dependent on its being kept straight if in any length, and when under those conditions its known strength or we might, perhaps, with more truth say its unknown strength, is considered to vary according to the quality of the iron, there being several kinds of malleable iron, some of them of near affinity in nature to the soft grey cast iron, and being fit to sustain a safe compression of from 2½ to 4 tons per square inch. It will therefore be likely that the top flange should be greater in sectional area than the bottom flange, and it is usually made about the same, but the rivet holes weaken the bottom flange by—say, 1-3rd, and thus top flange becomes to bottom flange as 3 to 2, and if the top flange

material were of 4-5ths the strength for strain resistance then the ratio of 5 to 4 in areas would give the required strength, but we have the greater ratio of 3 to 2, which we assume to be sufficient. We have, of course, always the difference between a crushing and a safe strain already provided, and which would cover any unexpected deficiency in compressible power of resistance, should such exist. The preceding is based on the assumption that the neutral axis must, per necessity, exist in the centre of the depth, but such may not, may, probably is not, really the case, but, however, let us proceed to consider the rolled joists with plate on the top. A rolled joist has its top flange of the same sectional area as the bottom flange, and therefore as it is of malleable iron it requires the top flange to be greater by at least 1-5th than the bottom flange, and if the metal were only capable of offering a safe compressible resistance of 2½ tons per square inch then it would require to be twice the area of the bottom flange in order that the neutral axis may be kept in the centre, because if the top flange be weaker than the bottom flange it is then evident that the fibres in top and bottom flanges would have to break simultaneously, and that therefore the neutral axis would exist at such place as would give equal power to each flange, and the top one would then be deeper and their proportion could approximately be determined provided we knew the relative tensile and compressible powers per square inch of the iron and the exact thickness of flanges and breadth and thickness and depth of web; but to keep the neutral axis near the centre we shall equalise the strengths of the flanges, and find it very convenient to put a plate on the top, and if such exceeds the proportion of 2 to 1 with respect to the bottom flange, then we have a little excess in strength, or we may consider neutral axis now to be nearer the top. That our theory is correct will be evident from the consideration that if the top flange were to become—say, a foot thick, and the web and bottom flange together an inch, then the neutral axis would necessarily exist in the top flange itself, which would practically in theory become a solid girder. Hence it follows that we may consider a rolled joist with a plate on the top if riveted to same to be

calculated by Fairbairn's formula $W = \frac{cad}{L}$ where W = breaking weight in tons, c is the constant—say, perhaps 65 for a rolled joist and plate on top, but the constant would vary with the proportion of the flanges, also the web, and might be as much as 75 for a broad strong joist of thick metal, and 80 for two or three stout rolled joists with plates top and bottom; a is the area of bottom flange in inches, and from which deduct what rivet holes there are in cross section; d is the depth taken, I should say, from near centre to centre of flanges, which gives the average of their working power, and being in inches, L is the length in inches. Now, where there is a bottom plate find the area of the top plate, and do not, until a better method be found, allow more than about ½ or, say, 2-3rds at the utmost of the area of the top flange to be taken for use in the formula as the area of the bottom flange, and then we should be safe from wasting knowingly any metal or being likely to run short in strength, but the bottom flange must equal the area used. The strength of iron being uncertain, we shall be right in making an allowance for contingencies. There being two, three, four, or any number of rolled joists side by side with a plate on top and bottom, will make no difference to the application of the formula. The calculation of the equalisation of strength of top and bottom flanges would in method vary according to the conditions given when the neutral axis would not be in the centre, but such girders are not fully utilising the metal-saving principle of making the flanges sustain the strains to the best advantage, because taking an extreme case and supposing we had no top or bottom flange, then we must increase the web much to prevent its twisting, when it will at once be apparent that the extra metal in the web could have been disposed to greater advantage in the flange of which we are inquis, but if such were necessary from any cause they could be calculated by integral increments having their origin in the neutral axis. Supposing a girder already made and having its neutral axis evidently not in the centre and knowing the strength of the metal, in order to find its neutral axis we should directly discover that the power in either flange was a function consequent on its unknown distance from the sought neutral axis, but by working on the integral system from an assumed neutral axis, and using a similar web and flanges, we can, after a few efforts, discover a near approximation to what we seek.—HENRY AMBROSE.

[5728].—**Coloured Building Stone.**—I am not acquainted with the stone called "Findon" stone. I should think "W. W." means "Finglas" stone, quarried near Dublin, the colour of which is grey or blackish in tint. It is a limestone, and largely used. I will mention a few stones of a yellow or red colour:—Ancaster, an oolite, cream-coloured, works easily, used in the St. Pancras station; Barnack Mill, Stamford, light brown, shelly, used largely in the Lincolnshire churches, and in N. Suffolk; Casterton, Stamford, light brown in colour, used in Ely Cathedral; Douling, a light brown, a good, easily-worked, and even-grained stone; Combe Down, cream colour, well known as a good material; Haydon stone, of a brownish colour, used about Grantham; Painswick, a cream-tinted stone, used in Houses of Parliament; Puddicote, brownish, used in Oxford; Yeovil, brownish yellow; Ketton stone, cream and pink, a durable stone; Anston stone, a cream brown; Mansfield stone, yellow, and Bolsover Moor, both well known for decorative purposes. All these are limestones. Of sandstones, I may mention Bramley Fall, a brown stone, very durable; Mansfield stone, a siliceous dolomite, of which there are several varieties. The red variety is well known, and makes a very excellent contrast with the greyer varieties. The dark coloured stones are the best. It may be seen used at the St. Pancras Hotel. Bedston, Carlisle, Corsehill, Fulford, Grimshill, Northfield, Parkfield, Kenton, Scotgate Ash, Shipley, Mallow, Money Point, Clure, Tyn-y-Cwm, and Spinkwell, are names of other quarries where brown or yellow-tinted sandstones are met with. I cannot speak here of the cost of transport, but many of them could be supplied at moderate cost.—G. H. G.

[5729].—**Pointing Red Brickwork.**—The material I have found to stand the best for pointing brickwork is mortar made of lime, procured from Barrow, in Leicestershire, mixed with fine sharp sand. It should be made up at least one month before it is used, and instead of adding water to soften it it should be beaten with a stout wooden



K L be the axial plane, and P the point of sight, and K P the central plane. Let lines A B, C D, E F, G H, and I J contain the plans of points in walls and in ridge, which may be shown in perspective. Case 1. Now if (as might be the case) one wished to depict the east end alone for

staff. By this means I have worked the mortar into a proper degree of plianeness after it has lain three months on the brick floor of a shed. Twenty-three years ago I used such a composition for pointing a building in a very exposed situation, and there are no signs whatever yet of any decay in the joints. Just before the pointing is done the brickwork should be saturated with water. The joints should be formed with a jointer of about 3-16in. gauge. In good brickwork, however, tuck pointing should never be resorted to, but the joints should be struck as the bricks are laid. The question of colour is, of course, governed by taste, but if left to my decision I should certainly not select either white or black, for the reason that either immoderately influences the general tone of the brickwork. If a white pointed building be viewed from a spot sufficiently distant to render the joints indistinct, the difference the white joints make in the colour of the general surface may readily be perceived. The gloomy effect of black mortar may be observed under similar circumstances. I think the pointing material for red brickwork should be slightly lighter in colour than the bricks. For the purpose of colouring the mortar I have in general used dust produced by the cutting of red rubbing bricks, together with a little Spanish brown and Indian red, in relative quantities according to the colour I wished to produce.—J. SAVILLE.

STAINED GLASS.

KING'S LANOLEY.—An heraldic stained-glass window, designed by Mr. J. Clarke, F.S.A., and executed by Messrs. Clayton and Bell, has just been placed in the Edmund de Langley Chapel, attached to All Saints' Church, King's Langley. It is the gift of the Queen, in memory of Edmund de Langley, the fifth son of Edward III., and first Duke of York, whose remains lie by the side of those of his wife, Isabel de Castile, under an altar tomb within the chapel.

DUBLIN.—A stained-glass window, erected as a memorial of Balfe, was unveiled in St. Patrick's Cathedral, Dublin, on Saturday afternoon. It represents Erin, with a pensive expression of countenance, lamenting over her son, and placing on the brow of the medallion a wreath of laurel. The other hand of Erin rests on an Irish harp—an accurate copy of that of Brian Borohme, which is preserved in Trinity College. The inscription states that Michael William Balfe—the most celebrated, genial, and beloved of Irish musicians—was born in Dublin in 1808, and that he died in Rowney Abbey in 1870. The artist of the window is Mr. Ballantine, of Edinburgh.

STATUES, MEMORIALS, &c.

MONUMENT TO GEORGE BUCHANAN.—There is shortly to be placed in Greyfriars' churchyard, Edinburgh, a monument commemorative of the late George Buchanan. The late Mr. David Laing determined to carry out, at his own expense, an idea which he had probably been the first to suggest. The eminent antiquary's notion as to the shape the monument should take embraced, as the leading and essential figure, a bronze head of Buchanan, to be copied from the best extant authority in regard to his personal appearance. A design was accordingly prepared by Mr. D. W. Stevenson, A.R.S.A., which, having been approved by Mr. W. Fettes Douglas, R.S.A., who acted as Mr. Laing's artistic adviser in the matter, was put in train for execution. The stonework has just been completed by Mr. James Kerr, Haymarket, and the bronze casting, modelled by Mr. Stevenson, being also ready, nothing remains but definitively to fix upon the site in order that the erection of the monument may be proceeded with. Mr. Stevenson has shaped his design for a structure 10ft. high. The style adopted is Classic. The ground-plan is square, and the basement consists of several courses of masonry, topped by a cornice and cope. On this rests a square block of stone, having in one of its four sides, each of which measures 2ft. across, an oval niche inclosing the bronze casting. In modelling this head, which stands out in high relief against the hollow background, Mr. Stevenson has followed what was considered as the most authentic portrait in existence. The monument is finished atop with triangular pediments, one surmounting each of the four sides.

WATER SUPPLY AND SANITARY MATTERS.

LANGWATHBY.—The Penrith Union Rural Sanitary Authority have just completed works of water supply for the village of Langwathby. The supply is from a spring at Moor Breast, a mile and a quarter from the village. The number of inhabitants supplied is about 300, and the total length of mains is 3,500 yards. There is a small reservoir at the head, and in the mains are sluice, air, and wash-out valves. Messrs. Watson, Ginn, and Co., of Glasgow, were contractors for the supply of cast-iron pipes; Messrs. Hamilton, Woods, and Co., of Salford, for the valves and hydrants; and Mr. J. Jackson, of Penrith, plumber, for the execution of the works. Mr. Watson, of Penrith, engineer to the Sanitary Authority, designed and superintended the works. The total cost was £568.

RETFORD.—A short time ago some gentlemen were boring for coal in a field near Retford, when they discovered a valuable spring of water. They relinquished the coal scheme and floated a company to supply Retford with water, Mr. C. Tomlinson, of Rotherham, being the engineer. The Retford Council refused to let the company break up the streets of the town, so the latter persons introduced a Bill into Parliament. The Council thereupon started a counter scheme, purchased land to the south-east of the town and commenced boring under the direction of Mr. Fairbank, engineer, London. They have now reached a depth of 170ft., and hope to meet with a supply of water. The question of who shall supply the town with water will be fought out in Parliament.

LEGAL INTELLIGENCE.

AN EMPLOYER FOUND LIABLE FOR INJURIES TO A WORKMAN.—At Bolton County Court, on the 2nd inst., before Mr. Crompton Hutton, judge, a man named Alfred Leather sued his employer, Mr. Thomas Peat, iron-founder, Farnworth, for £50, as compensation for injuries alleged to have been sustained through the defendant's negligence. On May 24th last, the plaintiff, who was foreman over the moulders, was sent for by Mr. Peat to assist in placing an iron beam in position. A temporary scaffolding was put up between the mechanics' shop and a shed by a millwright named Hardy, under the superintendence of the defendant. It was supported simply by four wooden crates, and when the plaintiff and other men got upon it the scaffolding gave way, and the beam fell on plaintiff's thigh, breaking it in two places. Plaintiff was laid up for a long time, and for a certain period was allowed by defendant 10s. per week, but when it was proposed to reduce the allowance he brought the present action. Defendant's solicitor admitted that the scaffold was insecure and ought never to have been used. The judge gave judgment for the full amount claimed, with costs.

CHIPS.

The Society House, Dunganmon, the only building in that town in which public meetings can be held, was re-opened on Monday week, after alteration and renovation.

It is stated that the Duke of Norfolk has subscribed £20,000 towards the erection of the new Oratory at Brompton, to be built from Mr. Herbert Gribble's designs.

The annual exhibition of works executed by the students of the Portsmouth and Gosport was held on Monday week.

Sir Anthony Panizzi, K.C.B., for many years principal librarian at the British Museum, died on Tuesday week, at the age of 82.

The Oswestry town council accepted on Monday week the resignation of Mr. E. B. Smith, and resolved to offer his successor £150 a year.

The concrete foundations are being laid at the intersection of Sackville and Abbey-streets, Dublin, upon which will be erected the statue of the late Sir John Gray. Mr. Farrell is the sculptor, and the preliminary work is being carried out by Mr. Toole, builder, of Dorset-street, Dublin.

A bill is printed, bearing the name of the Lord Chancellor, declaring that the New Law Courts shall be styled the "Royal Courts of Justice."

The Theford Town Council have elected Mr. Burke, of Manchester, as borough surveyor.

A stained glass window has been placed in the chancel of Orton parish church, Westmoreland, by Messrs. Clayton and Bell, of London. The subject is the Ascension of Our Lord.

Mr. Edward Freeman has been elected to the Keepership of the Incorporated Society of British Artists.

The dissolution of partnership of Messrs. Driver and Rew, architects, of Westminster, is announced, and also that of Messrs. A. P. Bell and G. F. Roper, architects, of Manchester and London.

The tender of Messrs. Foot and Lethbridge, for building the Oxford-street Schools, for the Plymouth School Board, at the sum of £3,912, has been accepted. Mr. S. Trevail, of Tywardreath, Cornwall, is the architect.

An apse and vestry are about to be added to the modern Church of St. John, Bury St. Edmunds, from Mr. Wyatt's designs, and it is proposed to place in the same church a new east window, at an estimated cost of about £200. A credence table and fold-stool have just been placed in the church; they were carved by Mr. Tooley from the designs of Mr. Wyatt.

The Torquay Local Board have invited Mr. Ernest Turner, of London, to visit the town and advise upon the best scheme for a fever hospital.

Our Office Table.

From a report just issued by the Derbyshire Archaeological Society, we learn that some further progress has been made during the past few months in the opening out of the ruins of Dale Abbey. The clearing of the Chapter-house has been completed, revealing its fine proportions; and the slype to the south has been further excavated, resulting in the discovery of a doorway into the atrium. A halfpenny of George II., dated 1747, was found on the floor, showing that the complete demolition of the abbey buildings is of comparatively recent date. Beneath the dormitory staircase, in the south transept, the saddlestone of the gable, with the socket for the cross, has been found. The precautions taken to protect the many monuments and other stonework from frost were effectual, no injury having been sustained. The excavations are open to the public daily except on Sundays, on payment of a small charge; the nearest station is at West Hallam, two miles distant. The works at the abbey have been suspended for want of money. The same society is taking steps to preserve and restore to its proper position an almost unique wooden effigy of a canon of All Saints', Derby, with its accompanying cadaver, which are at present rotting away in the town vault beneath the church. The tomb which once supported the figure is doubtless familiar to visitors to All Saints', Derby, as the carved arch with a curious row of figures of monks; it forms the front of what is now the archdeacon's seat. As there are probably not twenty wooden effigies in England, the county Archaeological Society urges the desirability of rescuing this interesting memorial from its present ignoble position.

DURING the laying-out of the new garden on the north-east side of St. Paul's Cathedral, Mr. F. C. Penrose, the cathedral surveyor, directed the workmen to search carefully on the presumed site of Paul's Cross, and at a depth of 6ft. below the surface the foundations were struck upon. They are octagonal in form, and in this respect, as well as in size and character, correspond with the old drawings and descriptions. In his lecture before the Royal Institute of British Architects, in January, Mr. Penrose indicated on a large scale map the most probable site of the Cross, and suggested the possibility of some fragments still existing beneath the surface, and it must be gratifying to Mr. Penrose to find that his theories have proved correct, as in the case of the old cloisters on the south, disinterred last summer. The Cross was erected at some period prior to 1287, when it is first mentioned in a writ quo warranto, and was raised to the ground by order of the Long Parliament in 1643.

MR. GEORGE EDMUND STREET, R.A., is to preside at the annual conversazione of the Sheffield School of Art on the 23rd inst., and will distribute the prizes. The Sheffield school has always stood high amongst the schools of art in Great Britain, and none have beaten it as regards the ultimate success of old students, of whom numbers have gone forth and made a name for themselves. The late Alfred Stephens, the sculptor of the Wellington memorial at St. Paul's Cathedral, was closely associated with it from its earliest commencement; and the late Godfrey Skyes was successively a pupil and second master thereat, remaining there until his appointment at South Kensington. The successors of this lamented and talented artist at the museum, Messrs. Reuben Townroe and James Gambles, are Sheffield School of Art men; so, too, are Messrs. Innocent and Brown, the well-known architects, whose score and more of superb School Board schools form by far the finest and most pleasing architectural feature in smoky Sheffield. Hugh Stannus, the decorator, and Harry Hems, the carver, are both old pupils. George Theaker, head master of the Wedgwood Institute, Burslem, Pigott the painter, Glassby the sculptor, and scores of others known favourably in the art world hail from the same veteran school. An exhibition of the works of past as well as present students will take place at the conversazione.

A CORRESPONDENT asks in the *Times* if it not be to the purpose to promote some inquiry as to the reasons which have produced the change from water-colour painting to tempera painting amongst our English painters? Much of the choicest quality of the middle school of water-colour art has unquestionably disappeared with the modern

lavish use of body colour as a white pigment. That the keeping of the paper and the using of washes of colour over its surface resulted in effects much more nearly resembling Nature's handiwork must be well assured to those who remember early works, say, of Hunt and other masters of this school. How, then, came this change of vehicle? It has always seemed that this was effected from the bad quality of the paper manufactured for art purposes. Many years ago the fault was attributed to the quantity of cotton rags then coming into use. Some thirty-five years since Creswick patented an invention for facing the commonest sort of drawing-papers with a thin layer of linen paper. This was particularly successful as to a very thin paper made by this method, but the paper was not quite white; it had a tint of not agreeable yellowness. As against the use of pure water-colour, and in favour of tempera painting, it may be stated that by the latter custom of production there is less danger from mildew than of old; that with common care in avoiding the use of glazing colours over portions of a picture laid in with solid white too hastily, the probability of permanence is added to by our new practice. Further, it seems that one or more of our vegetable colours become permanent from admixture with the Chinese white now used. The production of these works should be incomparably more rapid than could have been the case under the old system, so that it would seem that this change, resultant from the ill practices of our manufacturers, albeit changing our practice of art, has provided us with some equivalent as to durability.

A MEMOIR on the subject of the Croix Gammée or Swastika, by the Right Rev. Dr. Graves, Lord Bishop of Limerick, has recently been published by the Royal Irish Academy, as Part 3 of the 27th volume of their Transactions. Antiquaries do not appear to have published any notes on the occurrence of this disguised form of the cross on Irish monuments. But in this memoir illustrations are given of its occurrence on at least four ancient Irish inscribed stones, and on two of these, in connection with Ogam inscriptions, all of them apparently belonging to the Christian period—indeed, never yet in Ireland has it been found on a pagan monument. The author agrees with De Rossi that it is a very ancient device, which has been used as a symbol by many nations. It is to be found in the sacred books of the Persians, and was employed by the Buddhist priests. Dr. Schliemann has found it on pottery at great depths below the surface at Hissarlik and Mycenæ. It appears on coins of Palestine, Greece, and Sicily, and on gold Scandinavian bracteates, and De Rossi points to a Roman pagan monument on which it appears. "The truth is that the early Christians, finding this symbol in common use, employed it as a disguised cross in times of persecution, when, with their profound reverence for the sign of the cross they were obliged to combine a certain prudence, which restrained them from exposing the emblem of their faith freely to the view of pagans who made it the object of ridicule and reproach." Two of the stones, figured, were found near Glencar, in Kerry; a third, on one of the Blasket Islands off the coast of Kerry; and the fourth, near Minard, also in Kerry.

ON Easter Sunday, at evensong, a panic occurred in St. Peter's Church, Leicester, which created considerable alarm. The church is a new building, designed by Mr. G. E. Street, R.A., and a new ventilating door has just been placed in the tower. The church was crowded to excess, and just as the vicar was giving out his text the churchwarden ascended the tower to open the new ventilating door, which made a loud and startling noise. Just at this moment the gas was turned down suddenly, and some foolish person called out "Fire!" The congregation rose to their feet, and many rushed for the doors, on the way to which a number of ladies fainted. The vicar and some members of the congregation made efforts to quell the alarm, and the gas having been raised, a number of ladies who had fainted were carried from the church. It is stated that there was only one door unfastened and available for egress, and that all the doors are constructed to open inwardly, so that had the panic extended disastrous results must have followed. After an interval of ten or fifteen minutes the service was proceeded with, without further interruption. It is of course impossible to prevent timid, foolish, or mischievous people

from originating panics, but it is as well to provide against the inevitable consequences. From what we have seen of Mr. Street's churches, we believe practical matters such as ventilation, facilities for egress, &c., receive at his hands an amount of attention it would be well if all architects gave to them, and we are surprised to see it stated that it was otherwise with regard to the church referred to at Leicester.

THE United States Signal Service Station at Pike's Peak is the highest signal station in the world; it is also the highest inhabited portion of the globe. It is 14,336 ft. above the level of the sea. On the highest point of the summit stands the signal station—a rough stone building, 2 ft by 30 ft., one story in height. It is divided into four rooms—officers' room, kitchen, store-room, and wood-room. The station is 3 miles from the timber line, where the greater part of vegetation ceases. Short grass, tufted with delicate Alpine flowers, struggles for an existence against the frigidity of the atmosphere, and creeps towards the mountain top; but there are hundreds of acres of cold grey and reddish rocks where not a vestige of verdure exists. Like the dwellers of the arctic regions, the inhabitants of Pike's Peak have but two seasons—summer and winter: two months of summer—August and September—and ten long, cold months of winter. The summer season passes quickly. The atmosphere is congenial; the many visitors to the Peak enhance its social life with joy, wonderment, and mirth. During the summer of 1878 upwards of 900 people, in parties from five to thirty, visited the peak, among them many ladies.

THE development of a taste for art and art objects seems likely, says the London correspondent of the *Leeds Mercury*, to be marked by its destructive as well as by its conservative phase. "Hitherto we have been content to enter pleas for the protection of ancient monuments and against the modernising rage of certain restorers. We have revived the style of Queen Anne, and by precept and example have rehabilitated the Jacobean period. It would seem as if some of our leaders and art critics are anxious to carry their reforming zeal a step further, and to remove from our sight some of the monstrosities of the later Georgian and early Victorian period. It is true that such monuments as the Duke of York's Column and the equestrian caricature of the Duke of Wellington opposite Apsley House cannot be described as things of beauty, but should the new Iconoclasts once begin the work of destruction, our already bare streets and squares would be shorn of nearly every vestige of the past, from the figure of George III. taking off his hat to the cabmen in Cockspur-street to Colonel Cartwright meditating on the decay of life and morals amid the desolation of Burton-crescent."

THE largest library in the world is stated to be the National Library at Paris, which in 1874 contained 2,000,000 printed books and 150,000 manuscripts. The British Museum and the Imperial Library at St. Petersburg both contained about 1,100,000 volumes in 1874, and the relation is probably the same now. The Royal Library of Munich contains 900,000 books. The Vatican Library at Rome is sometimes erroneously supposed to be among the largest, while in point of fact it is surpassed, so far as the number of volumes goes, by more than sixty European collections. It contains 105,000 printed books and 25,500 manuscripts. In the United States the largest is the Library of Congress at Washington, which in 1874 contained 261,000 volumes. The Boston Public followed very closely after it with 260,500 volumes, and the Harvard University collection came next with 200,000. The Astor and Mercantile, of New York, are next, each having 148,000. Among the colleges after Harvard's Library comes Yale's with 100,000. Dartmouth's is next with 50,000, and then come in order Cornell with 40,000; the University of Virginia with 36,000; Bowdoin with 35,000; the University of South Carolina with 30,000; Ann Arbor, 30,000; Amherst, 29,000; Princeton, 28,000; Wesleyan, 25,500; and Columbia, 25,000.

OAK, according to a German technical journal, may be dyed so as to resemble ebony by soaking it for forty-eight hours in a hot saturated solution of alum and then painting it with a decoction of one part Campeachy wood in eleven parts water. This decoction should be first filtered and slowly boiled down to one-half its volume,

when ten to fifteen drops of neutral indigo tincture should be added to every quart. After the application of this solution the wood should be rubbed with a saturated solution of verdigris in acetic acid. The operation is to be repeated till the desired tint is obtained.

WHILE public attention is directed to the improvement of the street lighting of London (at present about the worst-lighted metropolis in Europe), "Fiat Lux" asks what is the advantage of placing the lamps on standards half-way into the street? The mean, unsightly gas-posts are convenient for catching the wheels of runaway cabs, or for a perch whence the little vulgar boy may enjoy the rare sight of a procession of any kind. But in what other way are they useful? They throw a shadow on every side, so heavy a one immediately beneath that on a gloomy night a prowling garrotter might find the lamp-post his best place of concealment. If the gas-pipes were carried up the house walls or the area railings, it would admit of strong reflectors being used, which would double the amount of light and throw it all into the public thoroughfare, collected, instead of, as at present, diffused in empty air.

THE Boston Chapter of the American Institute of Architects has, by invitation, united with the Boston Art Club and with the School of Drawing and Painting, with the object of holding a general exhibition of contemporary art in the new wing of the Museum of Fine Arts in that city. An unusually large proportion of the space available has been assigned to the architectural department of the exhibition. The exhibition is to open April 22, and no contributions can be received after April 12. An opportunity so conspicuous for increasing the public interest in works of architecture and decoration should not be allowed to pass by unimproved. It is worthy of observation, by the bye, that the general presumption that only pictures of architecture, and not plans, geometrical elevation, sections, and details, are acceptable to the public is not sustained, in America at least, by facts. The unexpected general interest evinced in the exhibition of the competitive plans for tenement houses in New York seems to show that pictorial demonstration is not the only way by which architecture can make itself interesting to outsiders.

THE opening of the Shakespeare Memorial Theatre, at Stratford-on-Avon, will be inaugurated next week by a series of festivals, commencing on Wednesday, the 31st anniversary of the poet's birth. A collation is to be provided in the Town Hall, after which appropriate toasts will be drunk, including "The Immortal Memory of Shakespeare," "The Shakespeare Memorial Association," and "The Drama." In the evening the first performance will take place in the Theatre, when *Much Ado About Nothing* will be placed upon the boards; the part of Benedict will be undertaken by Mr. Barry Sullivan, and that of Beatrice by Mrs. Theodore Martin (Helen Faucit). On Thursday evening and Saturday afternoon *Hamlet* will be performed, Mr. Barry Sullivan taking the principal character, and on Friday a miscellaneous concert of Shakespearean music will be given in the theatre. On the following Sunday, the 27th inst., sermons will be preached in the Church of the Holy Trinity, at Stratford-on-Avon, by Dr. Alexander, Bishop of Derry and Raphoe, and by the Rev. Stopford A. Brooke. The theatre, which has been erected from the designs of Messrs. Dodgshun and Unsworth, illustrated in the *BUILDING NEWS*, Sept. 15th and 22nd, 1876, has been finished, with the exception of ornamental details and interior decorations. The amount received in subscriptions has not, up to the present time, been sufficient to complete the whole of the scheme proposed by the Shakespeare Memorial Association, who have issued an appeal for subscriptions to enable them to realise the entire design, namely: in addition to the small theatre about to be opened, a library of dramatic literature, and a gallery to contain pictures and statuary of Shakespearean subjects.

OUR remarks last week on Sunday school planning have created some interest. In the "Wesleyan Sunday School Magazine," for 1876, to which our attention has been directed, we notice a series of articles on Sunday school planning by Mr. James Weir, A.R.I.B.A., who strongly advocates the radiating principle we referred to. Mr. Weir adopts a large central hall or assembly room of semi-circular form, with

circularly arranged seats and a platform in centre. Round these the class-rooms are ranged in vau-soir-like order, the outer walls retaining a rectangular form, the infants' school occupies the space before the platform,—the keystone so to speak, and the library and secretary's rooms form a small projection in front. There are separate entrances for the adult class-rooms; the class-rooms are lighted by windows in the outer walls, and the central hall from above the roof of front ante-rooms. Mr. Weir illustrates some good examples of American schools, which combine the radiatory and rectangular principles, and we shall be glad to find English architects adopting one or two of the lessons our transatlantic cousins have learnt, in economy and classification of arrangement.

ECCLESIASTICAL antiquarians will read with interest in the current number of *Scribner's Monthly* the account of a ruin in Newport, R.I., a very beautiful watering-place in America. It is a roofless, cylindrical, stone wall, about twenty-five feet high, like the remains of a round tower, built upon eight well-formed Norman arches, sustained by eight stout, round columns. It is built of small, broken stones, laid in mortar, generally termed "rubble work." The outside diameter of the tower is twenty-three feet, the walls are about two feet thick. The columns are ten feet in height, and three feet two inches in diameter. The arches are twelve feet six inches in height. The ruin has long been called "The Old Mill." But archeologists have now come to the opinion that it is the ruins of an ancient baptistery, and at least eight centuries old. It is thus the most ancient Christian building in the United States.

AN excavator on the pneumatic principle has just been completed by Messrs. A. Wilson and Co., of the Vauxhall Iron Works, Wandsworth-road, to the order of the New South Wales Government, for the purpose of sinking cylinders in connection with the improvements now in progress at Sydney Harbour. The apparatus, which is the invention of Mr. Reeves, the resident engineer of the Tay Bridge works, consists, according to *Engineering*, of two cast-iron cylinders, each 4ft. in diameter, bolted side by side on a framing, and both connected near the bottom to one suction 3½in. in diameter. The suction is of the necessary length for the work to be done, and has at its outer extremity a cast-iron nozzle of special construction. The delivery of the excavated soil is effected through a trap-door in front of each of the cylinders, which are also fitted with a float and gauge to indicate when they are full. The cylinders are domed at the tops, and are connected at that point by an iron pipe of small diameter, with an air-pump driven by a 4-horse power engine carried on the same framing, both the air-pump and engine being of the overhead type. On the air-pipe is mounted a three-way cock, by which either or both the receiving cylinders can be placed in or out of communication with the air-pump. The suction part of each receiving cylinder is fitted with a self-acting valve, so that either one or

the other or both of the cylinders can be used at the same time. The usual method of working is to use the cylinders alternately, that is, to fill one whilst the contents of the other are being discharged. It was largely owing to this apparatus that such rapid progress was made with the sinking of the cylinders of the Tay Bridge, its use enabling the contractors to effect a large money saving on their contract.

IN an article by the late Professor Hartt, reprinted in the *American Naturalist*, the author observes that among savage peoples generally the art of pottery making is, at first, exclusively practised by women, the reason being that the fabrication of earthenware is primarily and essentially a branch of culinary work—the latter everywhere falling to the lot of the gentler sex. Savage woman not only makes the vessels of clay, she also ornaments them, and if the fictile art has originated with her, and has grown up under her hands, it seems no less probable that the ornaments she uses should have originated with her; and the probability is increased by the fact that to her falls the work of spinning and weaving, and of making and decorating personal ornaments and clothes, and of making baskets, mats, &c. She is everywhere the primitive decorative artist, and to-day it is the exception that man occupies himself with ornamental art, even in civilised countries. Woman covers with ornament everything her hand touches, and the lady in her boudoir industriously embroiders, on some article of mere luxury, the same series of frets and scroll borders that, on the Amazon, the savage unclothed squaw as diligently and with as firm a hand traces with a spine on the damp surface of the clay vessel she is fashioning. The ornaments are in both cases identical, and not only of wholly independent origin, but it may be of very different age. Those of the savage are the mere embryonic beginnings of art life, while those of the boudoir are archaic forms, persisting through the ages, still flourishing unchanged among the varied wealth of derivatives by evolution from the ancient primary forms.

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CHIPS:

On Tuesday the business of Messrs. Child and Co., at Temple Bar, was commenced in a temporary building immediately adjoining their old premises at Temple Bar. The old room facing the street, known from generation to generation as "the shop," was at the same time dismantled, and is now doomed to immediate demolition in order to make room for the new banking house which will shortly rise in its place, only being thrown a few feet further back from the street. When this change is commenced, the last remaining stones of Temple Bar on the south and north sides of the street will be finally removed also.

The School Board for Sutton, Surrey, on Tuesday week elected Mr. Appleton as their architect.

The surveyors appointed by the Birmingham Free Libraries' Committee, Messrs. Martin and Chamberlain, and the assessors, Messrs. Thomas Naden and Sons, representing the Lancashire and the Yorkshire Insurance Companies, have completed their investigations, and the total amount of the damage sustained is valued at £20,063 5s.

A new Methodist Chapel at Scholes, Cleckheaton, was opened on Good Friday. The chapel has been built from plans prepared by Mr. R. F. Rogerson, of Brighouse. It is built in the Classic style, faced with ashlar dressings. On the ground floor is a schoolroom, 36ft. by 38ft., which is capable of seating 250. The total cost was £2,250.

At the last meeting of the Wakefield Town Council the resignation of Mr. Pagan, Borough Surveyor, was accepted, and Mr. J. G. Hesling was unanimously appointed Surveyor, at £150 per annum.

Mr. John Creswell, A.I.C.E., architect to the Corporation of Manchester, has been almost unanimously appointed County Architect of Northumberland. There were upwards of seventy candidates.

The Congregationalists of Colne, last week, opened their new chapel, which has been in the course of erection for the last fifteen months. The new building has cost £4,100. It will seat about 650 persons, and has been erected from designs by Messrs. Waddington and Son, architects, Burnley.

The foundation-stone of the second group of Board Schools at Guisborough was laid on Thursday week. The schools, which are intended to accommodate 1,600 children, are estimated to cost about £4,000. The architect is Mr. Bottomley, of Middlesbrough; and the building of the schools has been let to Mr. R. Cass, of Guisborough.

A new Roman Catholic church is being erected at Castlebar from the designs of Mr. J. J. O'Callaghan. It is of Thirteenth Century Gothic character, of a French type. It is built of the grey limestone of the district, with chiselled bands of red sandstone introduced at intervals in the building. Should funds permit, a tower and spire will be added rising to a height of 165 feet.

The Cork Town Council have received a report from a committee with reference to the duties of Mr. Matthias T. O. Keefe, C.E., recently appointed to the combined offices of city engineer and local surveyor, at a salary of £350 a year. The committee recommend that applications for works of improvement, &c., shall be received from any ten ratepayers, and that it will be within the province of the city engineer to suggest other necessary works; for these works half-yearly schedules and reports are to be prepared by the engineer, as well as annual reports on all roads, streets, bridges, public buildings, and public works in the borough. All works to be done by contract. It is further recommended that hock paving be substituted for macadam, and that the practice of renewing the surfaces of footpaths with gravel be condemned, and that the engineer be requested to suggest the best and most economical substitute.

A working stonemason, named John Hatton, in the employment of Messrs. J. Collins and Son, contractors, Warrington, has come into a legacy of about £80,000.

The corner stone of the new church of St. Paul was laid in Ashton-road, Oldham, on Easter Monday. The church is to seat 500 worshippers, and will cost £6,000.

Roofing Felts.—F. Braby & Co.

INODOROUS, SARKING, SHEATHING, AND HAIR FELTS KEPT ALWAYS IN STOCK. MANUFACTURERS OF PERFORATED ZINC, PERFORATED COPPER, AND PERFORATED IRON IN VARIOUS DESIGNS AND GAUGES.

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THE BUILDING NEWS.

LONDON, FRIDAY, APRIL 25, 1879.

THE INSTITUTE OF PAINTERS IN WATER-COLOURS.

THE exhibition just opened to the public at the Institute of Painters in Water-Colours, in Pall Mall, is more than usually full of works by well-known artists, though these are not of high interest or exceptional quality. The growth of a school distinguished by the use of a vehicle resembling in its solidity of effect that of oil is very apparent to the close observer of the pictures in this year's gallery, a very large portion of which are coloured with thick pigments. That this is a gain we have before expressed a doubt, as the essential character of water-colour painting is lost in thick body effects, and the decision of touch required by the old system of clear transparent washes of colour on white paper is lost. Those who admire the drawings of Prout, Cattermole, Hardy, of Hunt, or any of the school of old water-colour painters, some of whose works may now be seen in the South Kensington Museum, will value most the simple renderings in colour by those conscientious disciples of their art who have adhered strictly to its principles. In the exquisite renderings of landscape, such as Mr. E. M. Wimperis's "A Rough Common" (18), or Mr. Whymper's "Woods at Wotton" (155), we come across pictures in which the artist has boldly upheld the distinguishing qualities of transparent colouring. One of the most striking sea-pieces in the gallery is Mr. John Mogford's "Rosy Morn" (7). The sea is alone a fine piece of study; the reflections of the clear sky on the waves are cleverly produced by the local tint, without a particle of Chinese white or any body colour; the little creek, with its glassy calm rippled only by the breeze, catches the misty light of the roseate sky; the rocky cliffs with the castle, and the foreground masses are equally truthful, and the whole effect well sustains the title. There is just that hazy effect indicative of a fine calm morning by the seaside. Near it is a finely painted picture by Mr. E. G. Warren, called "The Mid-day Meal in the Harvest Field," but the handling is of a very different kind. The corn-sheaves are modelled with great care, but the near trees are a trifling finical in manner. Mr. Louis Haghe, the president of the Society, contributes as usual some masterly architectural pieces—we cannot call them sketches—as they have all the appearance of finished oil paintings. The "Interior of the Church of St. Gomar, Lierre, Belgium" (12), is a well-known subject. Mr. Haghe has produced it with all the force and feeling of which he is the master. We cannot overlook a slight crippled appearance in the arcade, the nearer curves of the arches at their points being wanting in fulness. The elaborate screen of late Flemish character, the reflected light and delicate half-tints on the round pillars, are all delineated with masterly effect. In the high lights body-colour is used, and the other drawings we shall refer to by-and-by have almost the solidity of tempera. We must not pass by a cleverly drawn coloured sketch called "A Pinch of Snuff" (10), in which Mr. Seymour Lucas has given a study of Georgian costume; the attitude, and swallow-tailed silk coat, cocked hat under arm, are thoroughly suggestive of the dandyism of the 18th century. In No. 14, "Moel Siabod," that favourite Welsh theme, Mr. O. Vacher contributes a warm-toned mountain effect, rich in body-colour and scumbled effects. Mr. Small's piece, "On

the Road to Falkirk Tryst" (17), lays no claim to water-colour; it is strictly a tempera painting. The water below the bridge is obscure and smudgy, and there is a thick and unpleasant effect. No. 16, "Which will be old maid?" a party of girls playing cards, is somewhat stiff and formal; the coiffure of the young ladies, the short-waisted dresses and sashes, are a sentimental reproduction of old-fashioned dress that seems to be running just now in the heads of artists; even the execution affects the old style. Mr. A. Bonvier's "Nydia" (20) is founded on Bulwer Lytton's "Last Days of Pompeii." The figure is graceful and poetically conceived, but the upper limb of the arm, partly exposed, is unquestionably too long, and the drapery is poorly drawn. Mr. H. G. Hine is as happy a delineator of the calm and softer character of landscape scenery as Mr. Wimperis is of the rugged and wilder beauties of nature. The latter generally chooses wild or desolate commons, marshes, and rocky mountain effects; his handling is rough and vigorous, and in admirable keeping with the subject. Mr. Hine, on the other hand, depicts with great tenderness the smoother features of pastures and downs and lakes, and his "Autumn Evening on the South Downs" (27) is one of his favourite themes. The long shadows of the declining sun and the prominent swellings of the undulating downs that catch the light are admirably truthful in colour. Mr. Collier's "Wide Pastures" (38) is a piece of similar character: the deep hollow with sheep is cleverly managed as regards the shadows. "Plover Church, Cheshire" (36) is a quaint little bit of interior, showing an interesting timbered roof, with curious cut chancel screen of late design; Mr. J. Fulleylove has done justice to it. But we come to another of Mr. Louis Haghe's fine interiors in No. 40, "Interior of the Cathedral of Sienna." This Romanesque building does not lend itself so well to the artist as the last-named by Mr. Haghe. The red-striped pillars are detrimental to that breadth of effect so conspicuous in the Belgian Church. In this work the artist has not been so careful in detail, the arches are not faultless in perspective, and the best parts of the drawing are the rich cornice over the arcade filled with sculptured heads, and the medallion heads in spandrels. The church has a blue star-spangled vault. Mr. Edwin Hayes, R.H.A., is a powerful painter of sea and atmosphere. His picture, "A Signal of Distress in the Offing" (42) is a splendid example of tempest-tossed sea and misty cloud. The boat putting off to the disabled ship, the broad colouring and drawing of figures, the crowding round the jetty make a picture worthy of a Turner in conception and execution. "The Reckoning" (47), by Mr. Townley Green, is an incident which would, if painted in modern costume, be commonplace and uninteresting enough, but the artist has chosen the more picturesque surroundings of an inn as they existed a century ago. Two gentlemen are seated at a table, and have finished their repast; one is asking for an explanation of the bill which he has in his hand. The accessories of the room, the coloured coats and embroidered vests, the cocked hats and wigs of the guests are tellingly introduced, and the grouping is admirable. Mr. Orrock in 54 depicts a wild mountain scene in the Isle of Skye. The blackness of mountain, the rolling clouds and misty distance, are solidly painted, though, withal, too sublime to be pleasing. Near it, a small picture, a lady and little girl at prayers in St. Mark's, Venice (56), is feelingly drawn. No. 57 is rich, but garish in colour; the blossoms of the rhododendrons, and the oak table, are striking in their reality. Mr. P. F. Poole's "Crossing the Brook" is scarcely equal to the artist's reputation, though the drawing

is truthful, and the figures balanced and expressive. In "The Forbidden Room" (68) Mr. John Fulleylove gives a charming bit of drawing and colour; the old-fashioned, wainscotted room, and the painted piano, and the little girl who has entered clandestinely, and looks around half-timorously, are feelingly painted. Mr. W. Wilson, in "Mischievous Float" (74), portrays an amusing incident in his usual lucid style. The group of urchins who have got into a boat, and are trying to row, and the little fellow leaning over the stern, attempting to sail one of his boots, are clever in drawing and colour: but the chief merit is the marvellous liquidity of the rippled water, and the gleaming, limpid effect of the colouring. "In Sunshine and in Shade" (82) there is a keen and delicate sense of the bucolic sentiment; the grand beech trunks, with their leafy shade, and the rich, sunny peep of bright corn-field beyond, are painted with great, almost excessive, care, but the shadows lack transparency and breadth. No. 91, "Interior of the Hall of Justice, Bruges," by the late J. Chase, is an admirable but common subject. The drawing is minute almost to painful excess. The black marble fireplace, with its white frieze and carving, and the elaborate chimney breast, are too mechanically rendered to do justice to this fine example of Renaissance. Mr. C. J. Staniland's "Repose," a child asleep in its cot with a ball in its hand, is pleasing. No. 105, "Steephill Castle, Ventnor," by Mr. E. Hargitt, is a fresh bit of colour. The deep blue sea shadowed by the sunny, verdure-clad cliff, makes a pleasant sketch, admirable in drawing and light and shade. One of the most remarkable pictures is No. 109, by Mr. E. Henry Corbould—"Jehu on his Way to Jezreel." The artist here has attempted to depict the "furious driving" of the grandson of Nimshi. Mr. Corbould has chosen the period at which Joram sends a horseman to Jehu with the inquiry of peace, and Jehu points the horseman behind. The dress, chariot, and trappings, the horses and furious driving, and the distant watchtower of Jezreel display unquestioned archaeological resources, and the painting is rich in colour. The stippled manipulation of the artist has produced an oil-like depth of tone. Mr. L. Haghe's "Hall of the Brewers, Antwerp" (130), we think we have seen before. The grouping of the figures in the picturesque costume of the burghers, the stamped gold leather of the walls and the rich colouring make a pleasing picture. A very striking work is Mr. C. Green's "Bartholomew Fair" (132), in which the artist has graphically depicted a fair of about seventy years ago. In the background we see the erections of itinerant showmen, with the stock paraphernalia familiar to our youth. Organ-grinders and clowns are engaged in front of their shows, inviting a motley crowd of sightseers. We see the dandy of a past generation, escorting two fashionably dressed ladies of the time through the assemblage, card sharps, cheap-jacks, and a variety of other frequenters of fairs, but the most marvellous part of the picture is the expression of countenance, the delineation of characters, and the bright colouring. Mr. J. D. Linton's "Early Scene in 'Gil Blas'" is an episode which will be familiar to the reader of that romance; the expression of the young man at the table, and the scheme of conception and colour are excellent, though the dramatic power of Mr. Linton's work is equally well conveyed in his other picture, "False" (138). Another of Mr. Haghe's pictures, "Church of San Martino, Rome" (135), shows a fine vestibule, through which a view of the interior of basilica is obtained. The processional group introduced makes a picture of a piece that is rather too coarsely drawn to be called an architectural drawing. Contenting ourselves with this rapid glance at the principal

pictures, we have only space left to point to a few others that we have noted. In 142, "Rose Bloom," we have rather a weak conceit, a fair-haired girl amid a bower of rose-blossoms; Mr. G. Kilburne's "Visit to the Studio," is an ordinary incident painted with much feeling; No. 152 is tender in sentiment and cleverly coloured; and Mr. Absolon's episode from "Bleak House" called "Mrs. Baquet" 169, must be allowed to be more clever in execution than in conception. Of landscapes "Southwold, Suffolk" (21) is bold; No. 44, "The Toy Seller," is a bright bit of colour without much aim; Mr. Clausen's "End of the Day" 50, is painted with much feeling; "Water Carriers of the Nile" by Mr. Guido R. Bach, rich in expression and colour; while Mr. L. J. Wood's pieces, such as 53, "Münden on the Weser, Hanover," and No. 163 are picturesque studies of architectural subjects rendered in the artist's well-known style. In the last named there is a tendency to become mechanical, and the foregrounds of Mr. Wood's pieces would all be improved if they were coloured with more vigour and solidity. No. 129, "The Tay from Kinnoull Hill," is a fine piece of river scenery. Nos. 112, 117, 121, 139, 141 and 170 are noteworthy. The screens are rather devoid of interest, though we note No. 174 and 184, both clever studies by Mr. F. J. Skill, also a small but well studied piece, "The Author," by Mr. A. C. Gow; "Under the Mid-day Sun," by Mr. Hubert Herkomer, and 206, by H. B. Roberts. Flowers, as usual, make up some charming bits of colour, and Mrs. Duffield and Marian Chase sustain their reputation in these departments of the art.

LIGHT AND AIR.*

ANY means of estimating the injuries produced by the deprivation of light and air, such life and health-giving elements in our large towns, must be welcomed as one of the most desirable objects of practical legislation. Mr. Banister Fletcher, F.R.I.B.A., has just published a text-book for architects and surveyors upon this somewhat difficult and obscure branch of the architect's practice, and how far he has succeeded in divesting the subject of mathematical theory, and giving a practical exposition of the matter, will be seen as we proceed. It may be unnecessary to inform our practical readers, that two scientific theories at present exist upon the subject of estimating the amount of obstruction: one is that propounded by Mr. Homersham Cox, and to which we have before referred in the BUILDING NEWS, a method which estimates the amount of obscuration made by obstacles of uniform angular width and height, measured by degrees horizontally and vertically from 5° to 90°; the other proposed by Prof. Kerr, some years ago, and which assigns certain lighting values to the surface of the sphere supposed to represent the lighting power of a window; both of which systems we may observe have not met with universal acceptance in the courts of law. Mr. Fletcher dismisses them at once as only worthy of study by the theorist, and observes they have been "rejected, as being too complicated, and not practical." We are quite ready to admit that, after all, common sense and judgment must be brought to bear upon the subject of estimating obstructions to light, and that, as long as courts of law have these questions to decide, evidence will have far more weight than mathematics. At the same time, we cannot be brought to think that some principle of measurement is not the right and rational mode of determining a large proportion of cases, nor to believe that the courts will reject a scientific

method of calculation simply because it is rather complicated. But let us pass on to the author's treatment of the subject. The book is divided into four parts. Part I. treats of the historical aspect, Part II. of the legal definitions of light and air. Part III. treats of the methods proposed for estimating the injury; and Part IV. indicates the course the surveyor should pursue in preparing his case. This division may possess some advantages, though it would have been better if the methods proposed for estimating the obstruction of light were placed first. We shall, accordingly, begin with Part III., in which Mr. Fletcher deals with the methods proposed, and the reason why a mathematical method is not desirable. The case of "Theed v. Debenham" is cited as an important case to show how little the angle of 45° can be relied on, and we may briefly mention it as one of practical interest. The bill was filed in 1875 by William Theed, sculptor, against Messrs. Debenham, merchants, of Wigmore-street, who intended to raise the height of certain premises in Mill Hill-place, whereby it was alleged by the plaintiff he would suffer material diminution of light, and would be deprived of not only a "direct light, but what is technically termed an under or low light"; and the bill prayed that the defendants might be restrained from erecting or constructing any building at, upon, or instead of the said premises. "A point of law was raised which turned upon the distance from each other, and height of the respective buildings. It was admitted that the width of Mill Hill-place from wall to wall was 31ft.; the height of the defendant's old building, No. 1, was 29ft. 3in., and of No. 2 31ft., from the foot pavement to the parapet. The defendants intended to raise their new buildings so that their new parapet would be 38ft. from the pavement, and their new ridge of roof about 7ft. above the new parapet." The centre of Mr. Theed's window and studio was about 13ft. above the pavement. The plaintiff's lights were all ancient, but their windows had been enlarged within 20 years from the filing of the bill. It was contended for the plaintiff that a clear uninterrupted horizontal light was necessary, and that a vertical light was not sufficient, a north light being considered preferable to any other. The defendant's eaves was just as high as the width of the street, and therefore Mr. Theed had an angle of 45°, and the defendants claimed to build to 45°, measured from a horizontal line drawn through the centre of Mr. Theed's window. We may quote that part of Vice-Chancellor Bacon's ruling that bears upon the case: "I take it, therefore, that it has been proved that there will be, if the defendant's buildings are carried up to the height they propose, a serious diminution of the light required by the plaintiff for the purposes he has mentioned, and which he has hitherto enjoyed." And after further observations on the test which had been adopted, of raising a screen to the height of the proposed new building, and letting it suddenly fall, whereby, in the judgment of the court, a very satisfactory illustration of the effect of the proposed change had been afforded, his lordship continued: "One of the witnesses has a notion that if the light is not interfered with to the extent of more than an angle of 45°, the right to obscure one's neighbour's light to that extent is a right which anybody may assert against the owner of any light which is already obscured to a lesser extent. He says in effect: 'I can raise the building to this height. My building obscures you to the extent of 30° only before, I will now obscure you to the extent of 45°; that is enough light for you, and with that you must be content.' . . . The regulation as to the angle of 45° is to be found, I believe, only in that provision of the Metropolis Local

Management Act, in which the width of street is spoken of, and which of itself, measuring the width of street and the height of house, furnishes an angle of 45°. That, be it observed, is from the street, for the statute enacts that in determining the height of such building the measurement shall be taken from the level of the centre of the street; and that must be so, because the position of the windows is so different in various buildings that if you were to search for the point from which to measure your angle of 45° it would be as various as the buildings to which it would be applied." The Vice-Chancellor declared there was no rule about 45°, and thus confirmed Lord Selborne's decision in the City of London Brewery Co. v. Tennant, and said that the plaintiff had proved a statutory right to the enjoyment of his light undiminished. Injunction was therefore granted. The above cited case is a very important one, as it sets at rest much uncertainty and ambiguity regarding the angle of 45°. The author next sets forth a table by which we can estimate damage or injury to ancient light, and, we may observe, this tabular mode of dealing with the subject is preferable to a lengthened statement. We will extract the table *in extenso*:-

MATTERS TO BE CONSIDERED IN ESTIMATING DAMAGE TO ANCIENT LIGHT AND AIR.

1. Quantity of daylight lost. This should be estimated at different periods of the year, because the value of light will differ. For example, take an office in the City. The loss of daylight in the summer when probably it would be after office hours would be of little consequence; but the loss in winter, when it would occur during the office hours, and would thus necessitate the inconvenience and cost of gas, would of course have a different value.
2. The particular use for which light is required, having regard to the fact, that for certain trade purposes, no amount of gaslight can be a substitute for daylight.
3. If for all the time it has existed it has been used for the particular purpose; if not, for what other purpose?
4. How far the enjoyment of the premises is affected.
5. How far by alterations of dominant owners' premises, the diminution of light may be avoided. In case this can be effected, it will be necessary to make a careful estimate of the cost of these works and the quantum of inconvenience they would occasion the dominant owner. This may be set out in the defence, and may influence the jury in assessing the damage; but it must be remembered in law the dominant owner cannot be required to alter his premises.
6. Whether the quantity of light and air is so far diminished as to render the room unhealthy for occupation.
7. How far the injury to dominant owner's premises may be reduced by the use in building servient owner's obstruction of white glazed bricks or facing it with white tiles or other material.

These heads of considerations embrace the chief points the surveyor has to consider. No doubt such a variable thing as light enjoyed under such very different conditions of atmosphere and necessary to different occupations in varying degrees is a very difficult matter to compute. Whenever an action has to be sustained it is necessary to prove a material diminution of light, and the author's advice is admirable in its way where the surveyor is enjoined to "free himself from party ties and look at the matter as a practical man"; but still we contend a method of estimating obstruction is useful as a guide—as a test. For instance, one surveyor or witness may be both practical and honest, and yet estimate a certain obstruction at a very different amount to another equally practical surveyor. Under such circumstances, how is a fair assessment of the damage to be made unless with the aid of some such method as that proposed by Homersham Cox? Mr. Fletcher, in the diagrams appended to his book, himself affords evidence that the court is more ready to take palpable proofs of the amount of obscuration produced by front, lateral, or skylight obstruction than it would *vis à voce* evidence of a conflicting character. The

* Light and Air. A Text-book for Architects and Surveyors. BY BANISTER FLETCHER, F.R.I.B.A., &c. B. T. Bateford, High Holborn, W.C.

author's comments on the items given above are practical and to the point; thus, as to 3, it is necessary for the surveyor to know if the premises are adapted for other besides the present purpose. The ruling of Vice-Chancellor Bacon we have above quoted favours the dominant owner, for he says distinctly the light which he enjoys is no more to be tampered with or taken away than the front wall of his house, and no man can be heard to say he may obscure another's ancient light because he has more than he requires. As to the enjoyment of the premises, it has been ruled by Lord Justice James that the amount of light, to be sufficient, should be according to the ordinary notions of mankind, "for the comfortable use and enjoyment of the house as a dwelling-house."

We pass on to notice the diagrams introduced to explain the amount of obstruction. These are supposed to represent the upper half of the windows, the view being taken with the eye 5ft. 3in. from the ground, and the body removed back one foot from the window. The field of view is divided into squares, and in one diagram the state "as it was" is shown, while another similar area shows the obstruction. By drawing the new buildings by the aid of the squares, the loss of sky or light is estimated approximately at a percentage of the whole area. Front obstructions are similarly shown, though in this case the area of the whole window may be sketched. In these the views are taken from the first-floor window with the eye at a height of 5ft. 3in. from the floor, and the body 1ft. from the window. From the ground-floor window the loss of light is of course greater, and sometimes total. The object of these drawings may be to show either that the slightest diminution is a great injury to the dominant owner, who may have very little light or sky above the opposite houses, or by the servient owner, that the premises are already so obscured that a little less cannot make any appreciable difference. Another kind of obstruction is called by the author a "distant lateral," or where a row of houses at right angles to the plaintiff's house, and on one side of it, are raised. In the case cited, the plaintiff contended that the raising of the houses made his house unhealthy from the loss of the sun's rays; but the author proved, by visiting the premises at different periods, and making diagrams of the effect of the sun on the house-front, that they did not overshadow the plaintiff's house. The last case illustrated refers to skylights. Here the view is taken looking upwards through the skylight, showing in one diagram the sky "as it was," and in the other "as it is" after the obstruction, the new building being drawn thereon. It often occurs that a shop lighted by a skylight is over-shadowed by raising an adjoining building, and such a case is shown by the author. A section is a necessary diagram in this case, to show the actual loss of rays suffered. In the frontispiece the lost rays are indicated by lines in red, the rays still left by blue. It may be necessary, for instance, to show that the raised wall obstructs the most useful light, as, for example, that on one side of a dispensary where medicines are made.

Having devoted a considerable portion of this article to the exposition of that part of Mr. Fletcher's text-book relating to the estimation of obstruction, we may now very generally glance at the other parts. These refer to the historical and legal aspects, with which our readers are probably better acquainted. A comprehensive synopsis of the leading definitions and cases we published last week under the head of "Light and Air," written by Mr. Jas. Ball, and we shall therefore confine the reader's attention to the main features of Mr. Fletcher's treatise. The author quotes very largely from the legal authorities in the matter, and we find the paper of Mr. Locock Webb, read at the Insti-

tute of British Architects, and reported fully by us, has been consulted. There are some injuries sustained by servient owner for which the law provides no redress, such as the diminution of the value of a house caused by its windows being overlooked, and the privacy of the house destroyed. Mr. Fletcher refers to three cases of this kind, and we might mention several others within our own experience. It is a kind of encroachment of daily occurrence, and in view of it the professional adviser should be particularly on his guard in recommending building or purchases on estates. How often a beautifully retired garden is overlooked from a row of tenements erected by the speculative builder; but no court of law will interfere on the mere ground of an invasion of privacy. Table II., given, shows how the right to light and air is acquired. 1. By continuous use for 20 years. 2. By express grant. 3. By implied grant. And (4) by a dominant and servient ownership, distinct from each other. The author cites several important cases bearing upon these items. As to the time, it is necessary to observe that, although twenty years is necessary to acquire the right, "yet, should any one take steps to contest it by erecting obstructions, nineteen years and one day will defeat the attempt." The difficulties of proving an implied grant are discussed. Table III. shows that neither non-completion of building nor non-occupation interferes with the right, a fact of some importance in many cases where the enjoyment of the premises has not extended to the whole period of 20 years. In the celebrated case *Tapling v. Jones*, we have the fact that ancient light may be imperilled by alteration or by variations. This case is quoted in full. Alterations of the plane at which light is admitted, the occupation by the dominant owner of the servient owner's premises, and ownership of both properties in the same parties, may severally jeopardise the right. Table V. shows that ancient lights may be lost "by servient owner obstructing for one year, by agreement between dominant and servient owners, or express release, and by abandonment." The last part of Mr. Fletcher's work is headed "The Fight," in which the author discusses the method of defending the client's rights, and what the respective surveyors may try to prove. These, of course, in effect, comprise the points already mentioned, and the author explains every item *seriatim*. A few useful hints in a tabular form are given, and the advice on the selection of counsel, skilled and other witnesses, will be found of practical guidance to members of the profession who may have a case of light and air placed in their hands, and who may wish to know the usual tactics made use of by the opposite side. The tables are a good feature in all Mr. Fletcher's handbooks, and the practical man will find them useful for ready reference. In the selection of cases and citations, perhaps a little more method might have been observed, and if the reports and rulings had been more condensed by the omission of a deal of unnecessary repetition, the book would not have lost in value. As we have hinted already, we should have liked a little more prominence to have been given to the methods of measurement, impracticable as they are considered, if only for the study of the surveyor, who must be supposed to be acquainted with the mathematical modes of determining the amount of obscuration. Notwithstanding, Mr. Fletcher's text-book is by far the most complete and practical we have seen, and the professional architect or surveyor who may be called in, either by dominant or servient owner, will do well to fortify himself with it, for he will find the *crème* of all the legal definitions and decisions he is in need of, and a practical exposition of at least one mode of determining the amount of injury inflicted. The work has a good index.

ARCHITECTURAL MOSAIC.

VI.—MODERN MOSAIC (*continued*).

IN no department of the art does modern mosaic show so decided a superiority over the ancient than in ceramic work, that is, work where the mosaic fragments are composed of earthenware. Its tesserae are harder and capable of enduring much more severe wear and tear; they are made in a far greater variety of colours, which afford scope for greater elaboration of ornamental design, while the brilliancy and polish of many kinds are not below the brightness of glass mosaic itself, and make it possible to employ the modern ceramic mosaic for wall decorations—a purpose for which, so far as we can remember, the ancient kind was seldom employed, being used almost exclusively for pavements. And the reasons for this superiority are not far to seek. In the first place, the ancient ceramic work was practised only as a provincial or colonial art, at a distance from the centre of the Empire. Nearer home, in Italy and in Greece, there was for a long time a plentiful supply of marbles, and afterwards, when that began to fall into disuse, glass mosaic arose. But in the provinces of the great Empire, when a Roman magnate desired to adorn his house with pavements resembling those of the imperial city, he was obliged to use such substances as he could find ready to hand in his adopted country for the materials for his tesserae, and to depend upon provincial workmen both to manufacture them and lay them down. Hence it follows that while the designs have all the merits—and demerits be it also said—of other branches of ancient mosaics, the ancient ceramic tesserae are mostly comparatively soft and perishable, the preservation of such as have remained to this day being due to accidental causes. But the modern ceramic work is practised under widely different conditions. Instead of being employed only where marble or glass was unattainable, it took its place in the modern revival as substantive mosaic, and being for a long time the only kind practised in this country, its improvement and development has been the constant study of several of our most enterprising manufacturers and our most accomplished artistic architects.

The following is a brief account of the successive improvements which have taken place in the manufacture of the tesserae:—The first modern mosaic pavements were those of Mr. Blashfield, briefly referred to in our opening article, which consisted of cements or bitumen coloured with metallic oxides, which stood exceedingly well under cover, but were found upon experience not to endure the severity of winter frost. These were succeeded by Mr. Singer's method of forming tesserae from thin layers of clay, previously prepared and stained of the desired colour, which were cut into long narrow strips or ribbons by means of a squeezing machine. These ribbons were then cut into squares, which were piled one on another fifteen or twenty high, being previously oiled to prevent adhesion, and then placed upon a frame sliding in two perpendicular grooves, with fine steel wires stretched tightly across, so that by pressing the frame downwards the wire sub-divided the slices into the square, oblong, triangular, or other shaped tesserae required, which were then dried and baked in the ordinary way. Tesserae prepared in this manner, however, would not be more enduring than ordinary earthenware tiles, and if artistic designs were to be employed worthy to last for ages it manifestly became desirable to find a more imperishable material, and this was happily found in the application of Mr. Richard Prosser's "dry process," originally invented for the manufacture of buttons, and which is now, with certain modifications of details, used by all our great manufac-

turers of mosaic tesserae. In 1840 Mr. Prosser discovered that if the material of porcelain (china clay) be reduced to a dry powder, and in that state compressed between steel dies, the powder is condensed into about a fourth of its bulk, and is converted into a compact solid substance of extraordinary hardness and density. Previous to this discovery the power which the hand of the potter exercised over his clay, and which had been proverbial from time immemorial, was limited to clay in its moist or plastic state, but by the new process the necessity of using wet clay is altogether avoided. The earthy material, after being prepared in the usual manner, and brought to the plastic state, is formed into lumps, which are dried until the water is evaporated from the clay. The lumps of dried clay are then broken into pieces small enough to be ground by a suitable mill into a state of powder, which is afterwards sifted, in order to separate all coarse grains and obtain a fine powder, which it is desirable should consist of particles of uniform size as nearly as can be obtained. The powder, so prepared, is the state in which the clay is ready for being moulded into the form of the intended article by the new process. The machine and mould used for moulding the tesserae, is to a certain extent an ordinary screw press, such as is commonly used for cutting and compressing metals for various purposes, but furnished for this manufacture with a hollow mould, formed of steel, the exterior cavity of the mould being the exact size of the tesserae to be moulded. This mould is firmly fixed on the base of the frame, so as to be exactly beneath the lower end of a piston or plug, which is adapted to descend into the hollow of the mould by a screw action, the plug being very exactly fitted to the interior of the mould. The bottom of the mould is a movable piece, exactly fitting the interior, which lies at rest during the operation of moulding, but is moved afterwards by means of a pedal, so as to deliver the article moulded. The operation is extremely simple; the operator first with his right hand raises the plug by means of the screw, quite out of the mould, while with his left he scrapes laterally, from the table near the mould, a small quantity of the prepared powder into the hollow of the mould so as to fill it completely and exactly. Then a turn of the handle brings the plug gently but firmly down upon the loose powder with a great force, which compresses it into about one-third the space it occupied in a loose state. The bottom of the mould is then raised and the tesserae delivered from the top of the mould, when it is found to possess sufficient coherence to enable it to endure as much handling as is requisite for placing a number of them in saggars ready for firing in the kiln. By this process the great contraction which takes place in drying articles that have been moulded from clay in the moist state is altogether prevented, and consequently all uncertainty in the extent of that contraction is avoided. The tesserae are extremely hard, and pavements constructed with them excel the finest works of the Romans in form, in colour, and every other mechanical condition.

The above process was very early introduced to the firm of Minton and Boyle, of Stoke-upon-Trent, by Mr. Blashfield and Mr. Prosser, and the late Mr. Herbert Minton took a lively interest in it, the first tesserae for mosaic work being made at his works in August, 1840. Progress was slow, however, until March, 1843, when a paper by Mr. Blashfield was read before the Society of Arts, and the process of making the tesserae were shown by Mr. Turley, the engineer to Minton's, 290 boxes of buttons, with 3 dozen in each, being given away at the doors. A second exhibition of the kind took place a few days afterwards at the house of the Marquis of Northampton, President of the

British Association, at which the Prince Consort and a most distinguished audience were present. This lecture led to the Prince taking a great interest in the manufacture, and henceforth its success was rapid and assured, the patent being worked until its expiration by Messrs. Mintons alone.

But great improvements in another direction have been also effected by the enterprise of Messrs. Maw and Co., of Bentham Works, Broseley. After the establishment of their works at that place in 1852 they spent several years in a series of costly experiments, with no immediate profit, but they gained experience by which they subsequently profited largely. Their first effort was thoroughly to investigate and experiment upon all the clays of the Staffordshire field, as well as the plastic materials found throughout the kingdom, many of which no one else had before attempted to turn to economic account. The results of these experiments have been illustrated in an extensive series of specimens of the clays or plastic slates of Great Britain, presented by Mr. George Man to the Government Museum of Practical Geology in Jernyn-street, and described in a supplement to the catalogue by Sir Henry de la Beeche and Mr. Trenham Reeks. In 1857, after all these years of patient labour, they commenced the manufacture of tiles and geometrical mosaic on a commercial scale, since which time their progress has been continually marked by the grafting on of new specialities, the yearly production of new colours, and new phases of ceramic art applied to tiles. From the first they laid themselves out for applying the very highest art and architectural talents to their manufactures. In 1856 they published a small volume of designs for geometrical mosaic by Sir M. Digby Wyatt, and in 1867 a much larger volume, which included the designs of such eminent men as Sir M. D. Wyatt, George Edmund Street, J. P. Seddon, J. Burges, Geo. Goldie, and others, as well as reproductions of all the best obtainable examples of ancient tiles, geometrical and Roman mosaic, &c. In 1861 they commenced the manufacture of very small tesserae for the formation of pictorial mosaics, and produced for the Exhibition of 1862 their well-known mosaic of "The Seasons," which is now in the South Kensington Museum, from a design expressly made for them by Sir M. Digby Wyatt. The result of this work was so satisfactory that the firm was afterwards commissioned to execute a mosaic frieze for the inner quadrangle of the new India Office at Westminster. Among the more recent productions of Messrs. Maw may be mentioned tesserae for mosaic work, decorated with rich enamels.

With all these improvements, modern ceramic work enters upon a by no means unequal competition with marble and glass work, as is forcibly illustrated by the splendid series of portraits of artists in the Architectural Court at South Kensington. Out of the whole series of thirty-five pictures no less than eighteen are in English ceramic work by Simpson and Co., Minton and Co., and Minton, Hollins and Co., and these are placed side by side for comparison with the Italian glass mosaic of Salviati, and English glass mosaic by Harland and Fisher, Rust, and Powell and Sons, where the colours are every whit as bright and the general effect quite as good as in the other material, except, perhaps, the gold ground, which is not quite so sparkling and transparent. The most considerable out-door work yet performed with ceramic mosaic in this country is the so-called "permanent fresco" in the great frieze of the Albert Hall, in London. This was executed with Messrs. Minton Taylor's cubes, and the effect is very pleasing and satisfactory. When its permanence is considered, the cheapness of this kind of exterior decoration

ought certainly to form a great recommendation. This whole frieze, containing 5,200 square feet, cost £3,444; but about £3 per square yard is about the average price for coarse out-door work, although some coarse work can be done for as low as 30s., whilst others will run to £4 or £5.

The process of combining ceramic tesserae into the design required is as follows:—

A careful tracing of the design having been made, portions in reverse of about 50in. square, are distributed to the assistants employed to execute the work. With the original before them, they set the various tesserae required to make out the design; at first loose, but afterwards, when a portion is accurately completed, dipping the face of each into gum, in order to make it adhere to the paper. The several portions so completed are then put together, with a wooden border forming a shallow trough round them, into which the Portland cement is poured, which sets the whole. The paper is then removed from the face, and when necessary, an iron band is placed round the work to bind it stronger together.

Tesserae are formed into paving slabs thus. Laid face downwards, on a perfectly flat slate, in the pattern or design required. Size and shape of the slab is given by strips of wood or slate fastened round the tesserae. Portland cement is poured on the backs of the tesserae, and two layers of common red tiles are added in cement, thus forming a flat and strong slab, which is fitted for laying down as pavement.

The better tiles and the larger tesserae for pavements are laid separately, on a carefully prepared foundation of fine concrete, and then set in fine sand.

Another process, the invention of Mr. Minton Campbell, is an attempt to combine the mechanism and durability of mosaic with the freedom of oil painting. It consists in the preparation of a surface composed of tesserae of a hexagon form, held together by potter's flux. The extent of this surface may be either that of the whole picture or of any portion that may be desirable. This surface is painted with vitreous colours by the artist, and the whole is formed into one mass by the usual process of baking. Its advantages are said to be that an unlimited variety of shades can be obtained without the heavy cost of ordinary mosaic. Specimens of this work may be examined by the students on the grand staircase of the ceramic gallery at South Kensington, but it can hardly be called true mosaic, as the joints of the tesserae are almost entirely concealed by the thickness of the painting and the operation of the flux.

In estimating for mosaic, as for everything else, it must be reckoned that there are masters in the art, who can always command superior prices, as well as ordinary workmen. The cost of work also will be much affected by the number and variety of figures introduced into the design, which occupy more time and require higher skill than plain work. The variety of colours also affects the cost, some colours being more difficult to manufacture than others; reds and purples are the most expensive, but gold and silver mosaic, especially silver, are more expensive than common tints. It is not far from the average to say that gold and silver tesserae are about double the value of coloured. The cost of the cartoon also must be added to the account, and it may prove a considerable item when designed, as it should be for important works, by an artist of eminence. In estimating the general cost of decorating the interior of St. Paul's with mosaics, a few years ago, Mr. Penrose calculated that for work at 40 or 50ft. from the eye, where fine work was unnecessary, 25s. per foot would cover the entire cost, including plaster work, and everything, but that the spandrels, each containing about 270ft. of finer work, would

cost about £500 each. The portraits of artists at South Kensington contain about 3sq. yards each, and their average price was about £140, which however did not include any payment to the artists for designs. If we could capitalise all the amount which has to be spent for repairs, repainting, and cleaning of other kinds of decorations, it would appear that although the first cost of mosaic is somewhat higher, its permanence, and fadeless brightness, would render it really cheap in the long run.

OIL AND WATER-COLOUR PAINTINGS AT THE GERMAN ATHENÆUM.

AT the German Athenæum in Mortimer-street, Regent-street, a choice collection of paintings and drawings is to be seen, which will remain on view till the 5th of May. The works comprise pictures and studies by L. Alma Tadema, A.R.A.; Guido Bach, J. W. Bottomley, Carl Haag, Hubert Herkomer, Sir F. Leighton, P.R.A., E. Long, A.R.A., Edward J. Poynter, R.A., B. Riviere, Dante G. Rossetti, S. F. Watts, R.A., Otto Weber, R. Lehmann, J. Whistler, &c. Mr. Alma Tadema is represented by a small cabinet picture of extreme beauty of execution, lent by Dr. Max Schlesinger. The subject, entitled "The Appeal," is conceived in a thoroughly classical spirit. A light-haired girl, in Italian drapery, is resting upon a long marble seat which extends the whole length of the picture. It is, apparently, the parapet of a bridge, for just above the coping a narrow streak of sea is apparent. In a recumbent position, lying full length on the seat by her side, is a dark youth, barefooted, who has put a question to the girl. The meditative mood of the maiden's face, her finger to lip, is exceedingly expressive; but the beauty of the composition, simple as it is, is the ideal sentiment and charming repose conveyed. The marble and the reflected light on the parapet and seat are alone worth inspection, no less than the quiet colouring and transparency. Guido Bach is so well known as an artist, that it will be unnecessary to say his sketches in water-colour are wonderful in their breadth and dexterous manipulation. We note a "Doorway at Plymouth," a sketch of an exceedingly good architectural feature, in which the colours are laid on with excellent effect; the cooler shadows upon the warm-toned surface of the stones are broadly managed, and the effect of roughness produced by some clever dragging of the dry brush. As an architectural sketch in colour this one will well repay the architect. The oil sketches by Mr. H. W. B. Davies, R.A., are freshly coloured; the smaller sketches, of which there are four, exhibit some of the higher excellences of landscape painting. We remark the delicate, yet broad, treatment of foliage and grass; the moonlight sketches are also exquisitely true and careful. Mr. Carl Haag sends a large water-colour three-quarter figure entitled "Eine Druidische Neize." The picturesque costume of the girl carrying a bunch of mistletoe in one hand and a sickle in the other, betokens her office; the face is sweetly expressive, and the gleam of light on the cheek and her golden hair are painted with extreme delicacy. Mr. Hubert Herkomer lends several portraits—all of them characteristic of that power and individuality for which he is noted. The portraits of his father and mother are life-like and vigorous; the modelling of features and texture of skin are masterly. We may particularly call attention to the portrait of "An Old Lady," and that of his child which exhibit in a marvellous manner the power and technical execution of the artist. These, and Mr. Edwin Long's series of studies of heads, painted in Cairo, Baalbec, Damascus, Granada, and Tangiers, of which there are twenty exhibited, form a collection of great interest to the admirer of portraiture and character, that cannot be surpassed. A picture in oil, of considerable feeling, mellow in tone, is Mr. G. Pope's "Daily Bread." It represents a widow artist seated in her studio, painting, a little girl behind her chair, with a picture-book in her hand. Mr. E. J. Poynter, R.A., exhibits four studies. The principal one is a cartoon for a picture in charcoal, representing "Perseus." Mr. Poynter has, apparently, taken the myth in which the son of Zeus arrives at the abode of the Gorgons. The composition is perhaps a little too much

broken up. The charcoal study for a picture is, in our opinion, more successful. Mr. G. F. Watts, R.A., sends a very impressive, though gloomy, picture of large size, called "Death," which certainly, whatever its merits, is rather repulsive to the feelings. In the gloom of night, under a massive arch, like that of Waterloo Bridge, which occupies the whole canvas, crouches a poor, forlorn woman, tightly wrapped in her scanty garments, nestling up to the arch, as if to procure warmth. We might mistake it for sleep, had not the painter given us the drawn and rigid features of death. The hushed quietness of night, the faint outline of a dome beneath the arch, and the reflected lights in the water are powerfully painted. Three studies of heads in red chalk, by Dante G. Rossetti, must be noticed for the poetical sentiment conveyed in the countenance, no less than for the execution. Near Mr. Britton Riviere, A.R.A., exhibits a chalk composition of forcible character, entitled "Acteon." Several smaller pictures call for attention. Mr. N. Chevalier's sketch of a mountain valley or glade is an extremely clever study of tinted foliage, the high lights being opaque upon a charming transparent ground. Mr. W. Kumpel's charcoal drawing, "Sport," is a study of much merit; here the forest of trees and the light and shade are vigorously drawn, and the same artist's "Beeches in the New Forest" are remarkably clever in the telling effect of broad washes of colour. We cannot omit to mention a composition drawing entitled "Spring," a festive procession in the New Forest, by R. Huttula; "In Tow," by Arthur Hopkins, a very clever sketch of water and boat ploughing the waves; and "The Highland Home," by W. Small; and H. F. Bluhm's "Modern Shylock," etchings by L. Lowenstam and J. Whistler, and some works by F. Walker, A.R.A., J. Wolf, and W. Bottomly. For powerful drawing and grouping, precision, and delicacy of technical qualities, the German school of artists, many of whose works are to be seen here, will well repay study.

COL. JAMES FAIRMAN'S PICTURES AND STUDIES.

AN exhibition of pictures and studies by the above gentleman is now open at 9, Conduit-street, the collection comprising chiefly views of some of the richest scenery in the United States. Col. Fairman is a painter of much power, and his pictures, if they do not equal some of those of our gifted landscape artists, have nevertheless qualities that will command attention. The finest is certainly his grand sea-piece, "The Power of the Sea," a study from the west coast of Ireland, which for grandeur of composition and breadth of handling is of considerable merit. A heavy sea is dashing over a rocky coast, the white surf of the waves being set off against a black thunder-charged sky. The painter has seized one of the grandest moods, and the rolling masses of water as they tumble over the sunken reef are painted with impressive force and liquidity. "The Indian's Adieu to his Native Valley, U.S.A." is a similarly large piece, with a touch of sentiment in it. The scene is supposed to be in Maine, a broad fertile valley, backed by mountains upon which sunshine and cloud have thrown an entrancing effect of light and shadow, and is being viewed by two solitary Indians. Rather fanciful, perhaps, it is intended to convey the reflections of the natives who have been driven from their beautiful country to the West by the Government. With good judgment, the artist has not intruded, by size or detail, his figures, which are, in this and other pictures, the least successful part of his work. We notice another picture, called "The Lake of the Great Spirit," suggested by the Indian legend that He appeared in the clouds of the sunset sky. It is a vast plain, lit up by a golden-red sky, the lurid clouds overhead assuming the form of an imagined deity. As a painter of architectural subjects, Colonel Fairman is less at home; yet "The Golden Gate, Jerusalem," is not without merit; the curved entablature of the gateway is carefully drawn. Another pleasing seascape is "Long Branch, near New York," showing the remains of a burnt vessel and some cleverly-painted sea. "The Plains of Sharon from the Mountains of Judaea" is a bright piece of sky, spoilt by the figures. We may notice the "Lake of the White Swan, U.S.A.," "A Mountain Torrent in the Highlands," as showing that

in water and mountainous or rocky scenery Mr. Fairman is *au fait*. A series of fine sketches in ink, chiefly American scenery in that most beautiful of the New England States, Maine, illustrate the artist's undoubted ability for landscape; and we notice one or two clever studies of rock and blue sea from the Massachusetts coasts, in one the stratification of the metamorphic rocks is peculiarly inclined, and appears to have been broken off. Those who are interested in scenery of this description will well be repaid by a visit to the Conduit-street Gallery. The pictures are all studies from Nature, and in the close rendering of some of her grandest aspects the artist has displayed both skill and technical knowledge.

ROTTEN ROADS.

MANY of our suburban roads are a real disgrace to a civilised community, and the cause in nine cases out of ten may be traced to an unsatisfactory adjustment of the parochial boundaries, or to an imperfect system of supervision. It is scarcely necessary for us to mention instances of bad and uncared-for roadways in the metropolis; they are found by hundreds in the outskirts of small residential localities, and though repeatedly brought before the public authorities by letters in the local papers, are destined to remain so. But it is of little use to complain so long as we see miles of roadway formed upon undrained ground, the inequalities of which are made up of rubbish heaps. In South London, no less than in the outskirts of the metropolis on the north-east, we may examine several roads which have been made up of "scavengers' material," utterly unsuited to form road foundations, repugnant to our sense of propriety, and certainly a source of danger to health. In what way such refuse can be deposited for this purpose it may not be difficult to discover; perhaps there is a contract with the scavenger of the district to deposit his rubbish at a certain place; however this may be, we have a right to be informed by whose authority such roads are constructed. In spreading road materials there is also, from want, of supervision a great deal of waste; the layers are not put on regularly, while the rotten substratum forms a soft, squeezable substance that soon produces holes and ruts. Some useful suggestions on this matter are given in Mr. T. Codrington's recently-published treatise on the "Maintenance of Macadamised Roads," lately noticed by us. Speaking of this, he says:—"A cubic yard of stones broken to a 2in.-gauge will cover about 30 square yards, so that 60 cubic yards would only coat about a quarter of a mile four yards wide. In this case each part of the road would be coated once in four years, and it must have sufficient strength to stand the wear of four years." Now in many roads the irregular wear is quite ignored, and we see every now and then a coating of new gravel placed alike on the unworn as well as the worn parts. The effect of this treatment must be obviously to waste material and to add thickness to places thick enough to bear traffic. Materials should only be laid on the parts that require them, and the object should be to bring the road to a uniform thickness throughout. Another weak point in the system of road-repairing or laying is that the hands employed to spread the material are not the most skilled in detecting the weak points of the road or in preserving the cross section of it. We have noticed many roadways upon which the most careless spreading takes place. But one of the principal points to observe in repairing is to apply the fresh material in the least wasteful manner upon those depressions or "slacks" of the road which require it. As in all good workmanship, there is an art here. The common method is to make the patches of new gravel square, by which a large part of the material is wasted at the corners. The worn hollows are invariably rounded or oval, sometimes irregular, and the art is to fill these hollows to their exact size and shape, and these patches will be found to be rather long and spindle-shaped, the ends being tapered to a point or very nearly so. Unless this precaution be attended to there are spots where the water will lie, and the patching in time produces unevenness and rotten roadways. Referring to the kind of material that produces the most economical result, we may observe that the French engineers have assigned certain values to different materials, and these are called "co-efficients of quality," but they have little

practical value, inasmuch as actual wear or traffic must be considered under particular circumstances. The harder limestones have advantages: they bind easily, the detritus mixed with the lime forming a kind of mortar which unites the materials. Chalk flints and gravel make good roads, and in the southern districts these materials are largely employed. Hard quartzose grits are recommended; and the idea of combining the coarser with the fine or cementing ingredients seems to be the correct one. A certain quantity of clayey gravel or chalk is necessary to make a coarse pebbly gravel bind well, and these materials may be sometimes added with good effect.

CAMPANILES AT SOUTH KENSINGTON.*

IN the architecture of other countries there are many features which at first sight do not commend themselves to the English taste. Among these are the campaniles of the North of Italy. With the form of the Leaning Tower at Pisa every educated Englishman has been familiar since his childhood; but he has been brought up to admire it rather as a curiosity than on account of any merits in its design or workmanship. Giotto's tower at Florence he considers a "pretty thing," though he has misgivings as to its architectural "correctness;" and he is usually pleased with the bell tower of the Palazzo Vecchio, in the same city. But there is a type of campanile very common in Northern Italy which few Britons admire until told that it is the proper thing so to do; we refer to the plain-sided, square-based towers, surmounted by open belfries, capped by short spires. A very eminent authority on architecture, Mr. Fergusson, in his *Handbook*, expresses what we venture to think was in pre-Ruskinite days the opinion of our best architects on the subject. He tells us that "throughout the whole of the middle ages the Italians retained the original square form" of tower, "making them as broad at the summit as at the base." And he goes on to say, "with very few exceptions they are without buttresses, or any projection at the angles to give them even an appearance of strength." That they have been strong enough to retain their positions since the middle ages does not seem to have satisfied the great architect. The consequence of their apparent want of support he considered to be that when a spire was placed "on such an edifice as this, it always fitted awkwardly"; and he finds fault with the medieval Italians because "they never understood the art of preparing for the spire," "first by the graduated buttresses of the base, then by the strongly-marked vertical lines of the upper part of the tower, and, above all, by the circle of little spirelets round the base of the central spire that made it an absolute necessity of the composition." Mr. Ruskin was, we believe, one of the first of our fellow-countrymen to go into raptures over these structures; having canonised Turner, he proceeded to beatify campaniles. Without committing ourselves entirely to his opinions on the subject, we agree with him that there is much to be said in support of the beauties of these North Italian bell-towers, despite their non-accordance with English views of belfry-building. Mr. Ruskin describes the campanile of St. Mark's at Venice, which is a good specimen of the style, as owing "none of its effect to ornament," as being built "as simply as it well can be to answer its purpose," with "no buttresses, no external features whatever," "one bold square mass of brickwork." He further describes it as having "double walls, with an ascending inclined plane between them, with apertures as small as possible, and these only in necessary places, giving just the right light required for ascending the stair or slope, not a ray more; and the weight of the whole relieved only by the double pilasters on the sides, sustaining small arches on the top of the mass, &c." A few lines later he adds, "Then, when the necessary height is reached, the belfry is left open, as in the ordinary Romanesque campanile, only the shafts more slender, but severe and simple, and the whole crowned by as much spire as the tower would carry, to render it more serviceable as a landmark." This arrangement, he observes, "is repeated in numberless campaniles in Italy." He then proceeds to compare the aforesaid tower

to one of the usual English type, very much to the advantage of the latter. Indeed his opinion of our native spires or bell-towers is so low that he goes the length of saying that "the four or eight pinnacled things we call towers in England (as in York Minster) are mere confectioner's Gothic, and not worth classing." We have no wish to enter into the merits or demerits of any bell-towers, and our only object in making the above quotations has been to show that Mr. Ruskin is the great prophet in this country of North Italian campaniles, and that we might naturally expect these who introduce them into England to be his disciples. But we shall refer to this presently.

Within the last few years there have been a few attempts at erecting Italian campaniles in this country, but they have not generally been on a large scale. The plainness of their arrangement has probably made some church-builders adopt it for economy sake, and they have, as the modern builder's phrase puts it, "run up" campaniles which are libels on Italian architecture. At last there appeared to be some promise of a satisfactory specimen of the style in our metropolis. Overshadowing one of the most deserted and little cared-for spots in London—need we say that we refer to the Horticultural Gardens?—two square-based masses of building suddenly sprouted from the ground, and out-topped the long line of the unfinished museum. At first even the Ruskinite was puzzled by these twin apparitions; but as they rose higher he fancied he recognised a likeness in them to the bases of his favourite towers, and as they advanced the similarity became more and more marked. It was not, however, until the open work at the tops began to shew itself that he permitted himself to indulge the hope that they were to be as children say, "really and truly" campaniles. Even then he was perplexed. What could they be for? Dismissing the idea that, like the gardens and conservatories beneath, they were to be allowed to become ruins, and like them, were intended to be exhibited to strangers at a shilling a head, after the manner of other ruins, he clung to the hope that they were perhaps destined to summon the neighbouring devotees to the High church and the Low church of the district, a chime of bells in a different key being hung in either tower to distinguish the one from the other. Only two other possible explanations remained—one that bell-ringing contests were to be included among the artistic accomplishments at South Kensington, the other that one belfry was to announce to visitors at the Museum the approach of trains bound for the Mansion House, and its neighbour that of those bound for Bishopsgate-street. But, like all other great works at South Kensington, the towers advanced more rapidly than the thoughts of deliberate thinkers, and before any definite conclusions as to their probable use had been arrived at by the *dilettanti* of Queen's-gate, the campaniles were finished. Their last stones showed a striking peculiarity. Instead of the spires being brought to comparatively sharp points, they were very blunt and curious in shape. As we looked at them, we remembered that the figure of an angel stood upon the spire of the campanile which occurred first to our memories; so we immediately concluded that these broad apexes were intended to support colossal bronzes which should excel even the Albert Memorial in their magnificence. We looked daily for the appearance of the angels, and at last saw something very different at the top of one of the towers. We hesitate to describe what met our eyes; but truth compels us to say that, instead of an angel, we saw a volume of thick and black smoke issuing from the summit of the spire, in a manner which reminded us far more of Birmingham than of Venice, and of the Inferno than of the abode of angels. Rejecting the dreadful thought which at once occurred to us, we endeavoured to persuade ourselves that the campanile was on fire, and were horror-stricken at the thought of the large amount of public money which might thereby be wasted. When, however, after patient watching, the campanile continued to eject dirty smoke in a very professional and chimney-like manner, we became reassured as to the safety of the structure, although we do not know that we were less uneasy about the waste of public money; and when the horrible truth flashed upon us, we should almost have been glad to have seen the building burnt to the ground.

We showed just now that Mr. Ruskin is the

great apostle of Italian campaniles, and that he is the chief authority on their merits. Let us, therefore, test these smacking campaniles at South Kensington by his standard. Writing of the virtues of architecture, he says:—"We have thus, altogether, three great branches of architectural virtue; and we require of any building:—1. That it act well, and do the things it was intended to do in the best way. 2. That it speak well, and say the things it was intended to say in the best words. 3. That it look well, and please us by its presence, whatever it has to do or say." Now with regard to the first of these three rules we have no complaint to make; the chimney evidently draws well enough—too well if anything; but as to the second, we can only say that the tower spoke as plainly as tower could speak, and said it was going to be a belfry and a belfry only, and that it afterwards turned out that in so saying it told what is termed, in schoolboy parlance, "the biggest lie" ever told by tower. Possibly its builders might defend it by saying that it was intended to tell a lie, and that therefore it did "say the things it was intended to say in the best words." How the disciples of Mr. Ruskin can reconcile all this with the "Lamp of Truth," of which he makes such a point in his *Seven Lamps of Architecture*, we are unable to say. As to the third rule, "that it looks well, and pleases us by its presence, whatever it has to do or say," we deny that a thing which is such a gross violation of every sense of art, beauty, or association—we had almost added decency—can possibly look well, or please by its presence, "whatever it has to do or say." The great high priest of campaniles particularly directs his followers not to mix ornament with business, and warns them against using golden ploughshares or binding ledgers in enamel; he tells them not to thrash with sculptured flails, nor to put bas-reliefs on millstones; and here we find them concealing an engine-chimney with the decorations of an Italian bell-tower. After this we do not think that the house-agents at Queen's Gate are likely to let a house to the critic who wrote many pages in praise of the lamp of truth in architecture, and called England "a machine and devil-driven country." The same writer laments that "there is not a tradesman's sign, nor shelf, nor counter in all the streets of all our cities, which has not upon it ornaments which were invented to adorn temples and beautify kings' palaces"; that there is not "the smallest advantage in them where they are," being there "absolutely valueless, utterly without the power of giving pleasure," only satiating the eye and vulgarising their own forms. He admits that "many of these are in themselves thoroughly good copies of fine things"; adding sadly, "which things we shall never, in consequence, enjoy any more." "Shall we ever enjoy campaniles any more?" is a question which those who happen to have windows looking upon the smoking tower under notice may not unnaturally ask themselves. Here is a fine form vulgarised, a form of ornament invented to adorn a temple, absolutely valueless and utterly without the power of giving pleasure. Why, in the name of art, of science, and of common sense a chimney could not be built like a chimney we have yet to learn; nor are we at all certain that a well-built factory chimney is much less graceful in its way than a campanile. It may be replied that its associations spoil it. Why, then, spoil campaniles by giving them the same associations? It is possible, indeed, that South Kensington might indignantly repudiate the authority of Mr. Ruskin, and even declare war against his principles. If this be the case, we congratulate South Kensington on the refinement of its cruelty. To take its enemy's favourite child, and expose it to shame before the eyes of fashionable London, would be a bitter revenge indeed. Perhaps the duties of inflicting torture, which were formerly allotted to the officials at the Tower, are transferred to the authorities at South Kensington.

If the hint thus given by the highest art officials in the kingdom is acted upon by our manufacturing fellow-countrymen, we may expect in a few years, whenever we travel through the Birmingham or Manchester districts, to see volumes of black smoke emerging from models of the dome of St. Paul's cathedral or even St. Peter's, of Giotto's tower, of the spire of Strasburg Cathedral, of the Great Pyramid, of Cleopatra's Needle, and even of those "paltry pinnacled things" the towers of York Minster and Westminster Abbey. Who knows that it

* From the *Saturday Review*.

may not become the fashion to make domestic chimneys also in the form of "good copies of fine things, which things we shall never, in consequence, enjoy any more!" We may live to see the roofs of our houses covered with "tall-boys" made after the pattern of the pinnacles on the roof of Milan Cathedral, and chimney-pots in the form of Etruscan vases. South Kensington will then, we suppose, feel satisfied that it has made England a really artistic nation. In the mean time, during our wanderings at Florence, Venice, or Verona, we shall be haunted by the dreadful thought that, in looking upon the campaniles of the past, we see the factory chimneys of the future.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AN ordinary meeting of the Institute was held on Monday evening, the President, Mr. Charles Barry, in the chair. The following gentlemen were elected to membership:—As Fellow—William Henry Clark, Leon Chambers, Bristol. As Associates—Spencer William Grant, 14, Duke-street, Adelphi, W.C.; Walter Wheeler, 25, Boscobel-gardens, St. John's Wood, N.W.; Robert Clamp, 20, Seale-lane, Hull; and Isaac Steane, 22, Little Park-street, Coventry. As Honorary Associates—Sir Francis Philip Cunliffe-Owen, K.C.M.G., C.B., Director of the South Kensington Museum, The Residences, South Kensington, S.W.; Henry Stacey Marks, R.A., 15, Hamilton-terrace, N.W.; Edward John Poynter, R.A., 28, Albert-gate, S.W.; and the Rt. Hon. Richard Assheton Cross, M.P., Secretary of State for the Home Department, 53, Eccleston-square, S.W.

The SECRETARY (Mr. White) read a letter from the Metropolitan Board of Works, stating that the board will have great pleasure in complying with the request of the Institute for copies of plans, and forwarding four series of plans: those relating to the proposed Tower Bridge, to building sites offered by the board to be let by tender, to the improvement schemes proposed under the Artisans' Dwellings Act, 1875, and a plan of the metropolis showing the properties condemned under the recent Streets Improvements Act. The Commissioners of Sewers for the City of London had also promised to forward plans of the two schemes about to be carried out under the Artisans' Dwelling Act.

Mr. VULLIAMY, architect to the Metropolitan Board of Works, said instructions had been given him by the board to forward to the Institute all plans of improvements and of vacant land available for letting.

IMPROVEMENTS IN GLASGOW, AND THE CITY IMPROVEMENT ACTS: ORIGIN OF THE ARTISANS' DWELLINGS ACT.

Sir JAMES WATSON, hon. associate, read a paper bearing the above title, and exhibited a series of maps, plans, models, and photographs, illustrating the condition of Glasgow before the passing of the Glasgow Improvement Act, 1866, and at the present time.

It will be generally admitted, he remarked, that if we would seek to elevate the great mass of our industrial population in our large cities throughout the kingdom, we must endeavour to provide them with comfortable dwellings. If the home of the working man be cheerless, dark and unwholesome, the result will naturally be to drive him to the use of intoxicating liquors and too often to the public-house. A strong feeling of this has long existed in Scotland, and with the view of furthering it, movements have been made both in Edinburgh and Glasgow, especially so in the latter, and the movements, although somewhat retarded by the too often injudicious conduct of the workmen themselves, with their strikes and trades unions, have been attended with beneficial results. Every stranger who visits Scotland must be struck with the difference existing between the dwellings of the humbler classes in Scotland as compared with those in England. In England they generally reside in self-contained brick buildings, whereas in Scotland they almost entirely live in large stone tenements divided into separate flats, with more than one family on each flat. But a still more striking contrast consists in the fact that a large number reside in narrow lanes or closes in the older parts of the principal towns in Scotland, and although many of these lanes have been removed there are still a considerable number inhabited by this class of the population. The old style of

building was to erect large stone tenements fronting the street, with gardens behind, but as population increased large blocks of houses came to be built on the sites of these gardens, and stretching back as far as from 200 to 280 feet. Dividing these high tenements were narrow passages, or closes of from three to four feet wide. This system of building long prevailed throughout the large towns of Scotland. In a work published in 1736 giving a history of Glasgow, the author, Mr. McUre, after enumerating the eleven streets which then constituted the entire town, compares it to a comb with teeth on each side, the streets forming the centre or wood of the comb, and the teeth on each side representing the narrow lanes or closes. Maps published in 1776 and 1800 show that in the part of the city then built (and when the population amounted only to about forty thousand) this system then prevailed. One is tempted to inquire what could be the reason which induced parties, when ground was comparatively cheap, to resort to such a style of building. In all probability it was resorted to for protection during the troublous times which so long existed in Scotland when families lived in masses to guard themselves from the raids of hostile clans or the oppression of the feudal barons. The early history of Glasgow is interesting. Originally it was a bishopric founded by David I. in 1120, who built a magnificent cathedral and richly endowed it. Houses gradually clustered around it; a university was founded in 1450, when the population amounted to 1500. As population increased ground rose in value, and builders taking advantage of the old system, and being without any Building Act to prevent them, filled up almost every inch of available ground in the centre of the city. The houses in these closes and lanes were long occupied by respectable people, but gradually deteriorated, and particularly so from and after 1847, by an influx of population from the rural districts of Ireland, bring with them habits which, however innocuous among the bogs of Ireland, were quite unsuited to the densely crowded parts of a large city. This class took possession of the closes, and greatly increased the overcrowding. In some of these closes from 600 to 800 people came to be huddled together. In 1866, when the Improvement Act passed, the density of the population in some parts of the city amounted in some cases to 600, and in others to about 1,000 per acre. The houses in these closes were generally old, dark, and ill-ventilated, without sufficient breathing space, and without family accommodation, there being only one ash-pit, &c., to each close—sometimes even for two closes—and when fever or small-pox broke out the results were appalling. The moral effect produced was not less disastrous. Such was the state of Glasgow when the Corporation, instigated by Mr. Blackie, then Lord Provost of the city, and Mr. Carrick, the city architect, formed the design of applying to Parliament for power to purchase and pull down whole blocks of these buildings, to sweep away these narrow closes, to open streets through the most densely-populated portions of the city, and to see that in lieu of these old and wretched houses buildings should be erected and vacant spaces arranged for, so as suitably to provide for the growing wants of the city. Plans were made with the necessary books of reference for the streets to be reformed and buildings to be taken down, and to every house scheduled notices were given, and an Act of Parliament applied for. The area of overbuilt ground thus scheduled extended to 88 acres, being nearly the whole of the old town shown in the map of 1800. The plans showed the formation of forty-five new streets or enlarged thoroughfares. Powers were sought to expend £1,250,000 on the purchase of these, and to take down, rebuild, or sell in conformity with the plans of the new streets or enlarged thoroughfares. Powers were also sought to borrow money on security of the buildings, and to impose a tax on the rental of the city (to be paid by occupiers) of 6d. per £ for five years, and 3d. per £ for ten years. The Act passed almost without opposition in the Session of 1866. Immediately thereafter a committee was appointed, over which the author presided, for the following six years. A tax of 6d. per £ was imposed for the first year, and a bank credit for £45,000 was arranged for until the tax was collected and money borrowed on security of the trust. A judicious person (Mr. Lamb) was appointed to negotiate for the purchase of property

privately, and as most of the buildings were old and dilapidated, and the owners willing to dispose of them, the committee succeeded in securing a considerable amount of property at very moderate rates. By the end of the first year they found themselves in possession of property to the extent of £500,512, obtained at from 10 to 14 years' purchase for dwellings, and 18 to 20 years' purchase for shops. By this time loans began to come in freely at 4 per cent. The sixpenny tax, which had raised a great amount of dissatisfaction and grumbling, was reduced to fourpence for the second year, at which it continued for four years. The purchasing went on, and by the end of the second year a large amount of property had been secured. Such owners of property as were willing to deal at moderate prices had their property purchased, while those whose demands were exorbitant were left over. A rule was laid down that no great improvement should be begun in any place which would enhance the value of the adjacent property until the whole buildings required for such improvement were purchased, and the adherence to this rule has tended much to the success of the enterprise. For the first two years nothing farther was attempted than putting the dwellings into a fair state of repair, and opening up some of the long closes by the removal of a portion of the back buildings so as to secure sufficient breathing space, and playground for the children. The pressure of the 6d., and afterwards of the 4d. tax, without the necessary changes being seen, gave rise to a crusade against the committee. However, everything was explained, and the good sense of the public ultimately prevailed. The proceedings of the committee were narrowly watched by builders, and when they understood that large clearances were about to be made, and remembered how little had been done for years in the erection of workmen's houses, they immediately commenced operations. The rage for building workmen's houses went on from year to year, whole streets of new houses sprung up, until the supply exceeded the demand. The committee, at first fearing that sufficient house accommodation might not be found for the displaced population, purchased two large lots of building ground in the vicinity, costing, including sewerage and laying out of streets and squares, £80,661, to give off to builders for erecting workmen's houses at moderate rates. The plan succeeded and resulted in a profit of £15,000.

In about two years after the passing of the Act, commenced the demolition of some of the old and dilapidated buildings which had been purchased, such tenements as were dens of fever and disease, and haunts of the criminal classes, being taken down at once. This demolition process, however, required to be gradual, as it was necessary to prove to the sheriff before ejecting more than 500 persons of the labouring class that an equal amount of house accommodation suitable for such class existed or had been otherwise provided. In this, however, there was no difficulty, as the erection by private enterprise of the new went on much faster than the demolition of the old. The clearance thus effected by the committee, aided as it was by certain railway operations requiring similar treatment, had soon a marked effect on the health of the inhabitants, whereby the mortality, particularly of children, was considerably lessened. For the first four years the attention of the committee was chiefly occupied with the purchase of property and removals already alluded to. The rest of the property was put into a sufficient state of repair and let so as to secure a proper income. By 1870 the property secured amounted in value to £735,000, and the money expended to £764,063, and in 1871, £931,231. In 1871 the Act was extended five years, and in the same year the chief constable reports as follows:—"Through the operations of the City Improvement and the Union Railway, the city has been cleared of the foulest dens of profligacy and crime, and their occupants scattered among a population breathing a purer atmosphere, thereby affording facilities to the police for bringing the vicious to justice more easily and certainly, than when the whole formed a concentrated and combined colony of ruffianism." Fears were at one time entertained that the dispersion of the low class to other parts of the city might contaminate these places, but these fears were found to be groundless. On the contrary, the sanitary inspectors have repeatedly reported that the condition of the displaced population has been

improved, and that, although paying higher rates for better houses in other districts they are satisfied of the advantages of the change. About 1871 the improvements began to be carried out by the sale of the ground with its buildings in order to carry out the plans laid down by the city architect. Care was taken not to put much in the market at one time, and the price obtained exceeded expectations. In all cases the ground has been disposed of by public sale. The result of the committee's proceedings to the present time may be enumerated as follows:—

	Property Bought and Paid for.	Ground Sold.
In 1872 ..	985,159 ..	124,307 ..
„ 1873 ..	1,087,365 ..	180,762 ..
„ 1874 ..	1,241,353 ..	513,112 ..
„ 1875 ..	1,315,008 ..	565,136 ..
„ 1876 ..	1,431,593 ..	774,091 ..
„ 1877 ..	1,487,362 ..	883,634 ..
„ 1878 ..	1,538,971 ..	921,538 ..

The property has been all acquired by private negotiation with the exception of three jury trials. The result of the operations has been to reconstruct large portions of the city. Wide and handsome streets with spacious shops and dwellings have in many cases taken the place of narrow streets, and lanes of old and dilapidated buildings. Narrow closes from whence the criminal classes were wont to issue nightly in quest of prey are now all but unknown, and respectable dwellings and warehouse premises have taken their place. Fever dens have been removed, and the death rate which was on an average 29 per 1,000 in 1866, was reduced to 25 per 1,000 in 1876, a saving of life in a population of 500,000 equal to 2,000 annually. Last year the average was 26 per 1,000 notwithstanding the unusually severe weather during the last months of the year. There are still, however, portions of the city requiring reconstruction, which are being attended to by the Commissioners. Ground in the centre of the city was found to be too high in price to allow of the erection of workmen's houses. The buildings, therefore, which were erected there on the site of those pulled down, have consisted chiefly of shops and warehouses, along with dwellings for the middle classes. Those built for the working class have been erected at some distance from the centre of the city, where the sites were less costly. The following letter, received from Mr. White, the Assistant Master of Works, explains one of the plates exhibited at the meeting, and is an average specimen of the class of workmen's houses lately erected:—"Dear Sir,—I send herewith two tracings. Plate 8 is the plan of building erected by the Magistrates and Council in Warwick-street, which is 60ft. in width. It consists of four flats, each flat having two separate dwellings of two apartments and scullery. The arrangement is one of the best that exists; the apartments are large, the ceilings of good height—viz., 10ft., and the height of the building 45ft. 6in. The free space requisite is three-fourths of this height, actually it is much greater, as the plan shows. Plate 9 is the plan of building erected in Dalmarock-road, a street of 50ft. in width. The ground flat is occupied by two shops, each of which has at the back an apartment which may be used as a dwelling. The three upper flats have three separate family dwellings on each flat, two of them having two apartments, and the centre one one apartment. The single apartment I do not approve of, my opinion being that there should be no separate dwelling of only one apartment. The height of the building is 45ft., the ground flat having a height of 12ft., the others of 10ft. The free space necessary, in accordance with the Police Act, is three-fourths of the height. Notwithstanding the great care taken by the Court in examining plans to see that the arrangements for dwelling-houses are as complete as possible, in some instances it is rendered unavailing on account of houses, consisting of three and four or more apartments, and which when the plans passed the Court, were shown as and intended to be occupied as one dwelling, being converted into single apartments. If the proprietors were bound to make application to the Court, it would not allow such alterations without sufficient means of ventilation being provided."

By a clause in the Glasgow Police Act, obtained in 1866, no building in which there are sleeping apartments is permitted to be erected, unless there be a free space in front of the window equal to at least three-fourth of the height of the wall in which it is placed. In streets formed since the Act, the width of the street must be equal to the

height of the building. Where there are no sleeping-apartments, it is in the discretion of the Court to allow the building to be higher than the width of the street by one-fourth. In the old streets, however, formed previous to the passing of the Act, there is no such restriction as the width of the street regulating the height of the building. The consequence is, that large tenements, in which there are no sleeping-apartments, have been erected in several of our narrow streets, thereby excluding to a large extent the sunshine, air, and light of heaven. The restriction as to the free space in front and behind all buildings in which there are sleeping-apartments, amounts on an average to about 30ft. of open ground. As far as the space in front of the building is concerned, it is well adhered to; but as regards the space behind, the Act is frequently evaded by parties who are proprietors on both sides of a square erecting tenements with a space of 30ft. between the buildings in place of 60ft., which would be required if the buildings belonged to different parties. Thus the 30ft. is made to do double duty. This is felt to be particularly objectionable as regards hollow squares, where, as they are closed on all sides, there is a total want of air circulation. A very salutary regulation was introduced into the Police Act, requiring all apartments to be of such a size as to admit a certain amount of cubic feet of open space, as follows:—"If such dwelling-house consists of one apartment, and was used as a separate dwelling, previous to the passing of the Act, unless it contains at least 700 cubic feet of space, or, if it was not so used, unless it contains at least 900 cubic feet of space. If such dwelling consists of only two apartments, and was used as a separate dwelling previous to the passing of the Act, unless it contains at least 1,200 cubic feet of space, or, if it was not so used, unless it contains at least 1,500 cubic feet of space. If such dwelling consists of only three apartments, and was used as a separate dwelling previous to the passing of the Act, unless it contains at least 1,800 cubic feet of space, or, if it was not so used, unless it contains at least 2,000 cubic feet of space." This is exclusive of closets, presses and recesses not exceeding four feet in depth, and not having a separate window therein. By a subsequent clause powers are given to persons appointed by the Board of Police from time to time to enter any dwelling-house which consists of not more than three apartments, for the purpose of measuring, in cubic feet, the space contained therein, and to mark on or over the outside of the door of any such dwelling-house (if the cubic contents thereof do not exceed 2,000ft.), or to affix thereto a ticket on which are marked, in such position and style as the Board see fit, the number of such cubic feet, and the number of persons exceeding the age of eight years who, without a breach of the provision after mentioned, may sleep therein. This provision is, that when apartments are used for sleeping in by a greater number of persons than in the proportion of one person of the age of eight years or upwards for every 300ft. of space, or of one person of an age less than eight years for every 150 cubic feet of space contained therein, every person so using or offering to be used, shall be liable to a penalty not exceeding five shillings a day during which it is so used. The overcrowding which existed previous to the passing of this Act may be learned from the fact that, of 58,003 houses visited in 1866, the year the Act passed, no less than 4,948 were found overcrowded; and such at that time was the scarcity of workmen's houses, that the police were unable to carry out their regulations with effect. The number summoned that year was, therefore, only those of a very aggravated nature—viz., 953. In 1847, the Superintendent of Police reported in regard to the numbers living in lodging-houses of a low class, that were he strictly to enforce the Lodging-House Regulations, he would turn out 6,000 persons nightly to the streets. Since the Improvement Act came into operation, however, with the erection of whole streets of houses for the working classes, it will be seen by the following figures how greatly and gradually this overcrowding has decreased, although from the nature of the population it will always to a certain extent exist. In 1871, the number of cases brought before the police-court for overcrowding, after the magistrates began strictly to enforce the regulations, were, in 1871, 3,143; 1872, 1,741; 1873, 1,162; 1874, 1,540; 1875, 1,623; 1876, 1,446; 1877, 1,247; and in 1878, 1,141. Thus, in 1878, a year of great poverty and want of

employment, the cases were not much more than a third of what they were in 1871. The regulations contained in the Police Act in regard to free space and size of apartments, along with others for securing sufficient ventilation and drainage, have tended so far to the improved sanitary condition of the city; but in this respect they are still found inadequate to cure the evils under which we suffer. An application has consequently been made to the Home Secretary for a provisional order giving additional powers. "If the public health is to be considered, application should be made (our authorities think) to the Court, and consent obtained before houses of four, five, and six apartments can be reduced to houses of one or two apartments. The free space connected with buildings should be made what it was originally intended by the Act, and hollow squares should for the future be prevented. The cubic feet of space in the apartments of small houses should be enlarged, and all drains, soil pipes, and cesspools be constructed and ventilated to the satisfaction of the Dean of Guild Court and the Master of Works." This last is a matter of vital importance to the health of the community. The Dean of Guild Court, to which everything connected with the erection and superintendence of buildings and formation of streets is referred, consists of the Dean of Guild as President of the Guildry, or Merchantmen, along with three master-tradesmen sent by the Trades House, three merchants from the Merchants' House, the Master of Works for the City, the Fiscal or Public Prosecutor, and a legal Assessor. No building can be erected until the plans are submitted, examined and sanctioned by this Court; and all alterations affecting the exterior of any building must also, before being executed, pass this Court. A supervision is kept over all buildings in course of erection, and when buildings become dangerous they are required by the Court either to be rendered safe or taken down. The decision of the Court can only be appealed to the Court of Session; and such is the care taken in these decisions, that very few are ever appealed. This Court has proved of the greatest service to the community. It is evident that no lasting benefit can be derived from Improvement Acts, unless care be taken by sufficient building regulations to prevent the recurrence of such evils as these Acts are intended to remedy. In vain need we spend money to lessen the density of the population, if builders are to be allowed to place erections on every available inch of ground; and in vain do we seek to improve the health and comfort and morality of the people unless we secure for them a free circulation of light and air. We come now to inquire at what cost this has been effected. In a careful estimate made up by the author with the aid of Mr. Morrison, now the chairman of the committee, and Mr. Nicol, the city accountant, the whole cost of these improvements at 31st May, 1877, was found to amount to £178,462, arising from waste rents, interest of ground for a time unbuilt before being sold, parliamentary expenses, and expense of management. The result was made up as follows:—Ground sold and on hand as valued, £1,647,332, and ground sold and paid for, £1,612,501, showing a difference of £34,828. There have been taxes raised, £283,462, and taxes are to be raised at 2d. per pound, £80,000, making a total of £363,462. From this we must deduct price of a public park, £40,000; ground thrown into streets and open spaces, valued at £100,000, and paving streets and construction of sewers, £65,000, in all £205,000. There is thus a net loss of £158,462, which with £20,000 allowed for contingencies, makes the whole charge to the city, £178,462, as already stated.

The last point is the manner in which the displaced population has been provided for. It has been shown by the chairman, Mr. Morrison, that during the first ten years after passing the Act, say until the middle of the year 1877, the population displaced was 28,965; we must add natural increase of population requiring accommodation, say 9,000 annually for ten years, 90,000, a total of 118,965. To meet this there have been provided within the municipality accommodation for 202,302 persons, and outside the municipality, and within half-a-mile radius of the city, accommodation for at least 100,000, in all 302,302, so that the supply is in excess of the demand by 183,337 persons' accommodation. While this provided for all who were able to pay a moderate rent it entailed considerable hardship on a class belonging to a lower strata who lived

in small houses and rental at £2 10s. and £3 per annum. Accommodation has been found for these:—1st. By a number of tradesmen vacating their old and removing into the newly built houses; 2nd. By converting large dwellings in the older parts of the city into single and double apartments; 3rd. By the erection of model lodging houses, where parties unable to keep a house are provided with lodging, including fire, gas, and cooking utensils, at 3½d. per night, or 1s. 9d. per week; Sunday gratis. There are now five of these houses belonging to the Trust, and two more in course of erection. The cost of the whole is estimated at £80,000. They are all well frequented, and are self-supporting. The construction is peculiar and well adapted for the purpose. A shop or store is attached to each house, where the inmates can procure such articles as they require and cook them in the large cooking hall of the house. There are also cooking depôts throughout the city where good food is supplied at very low rates. The proceedings I have described attracted the notice of Mr. Cross, the Home Secretary, who requested information as to details. He afterwards visited the scene of these operations, and as the result brought in and passed the Artisans' Dwellings Bill, which promises, if taken advantage of, to be of great value to our large cities. It is deeply to be regretted, however, that so very few of them have as yet done so, although in many the reforms alluded to are loudly called for.

A discussion followed the reading of the paper, and was continued on Tuesday evening. We are compelled to hold over our report thereof till next week.

THE CARLIOL TOWER, NEWCASTLE.

MR. E. J. SMITH, the Crown Receiver for Northumberland, held an inquiry at Newcastle-on-Tyne on Saturday, on behalf of the Lords of the Treasury into the petition presented against the proposition of the Newcastle Town Council to remove the Carloli Tower in connection with the erection of the new free library. The Sheriff spoke in favour of the Corporation plan, and pointed out that all the alternative schemes had been fully considered by the committee before they decided upon the one they sought to carry out. The Commissioner asked if there was no further point as to how far it was absolutely indispensable that this tower should be extinguished, and as to whether it was possible to adopt a scheme for keeping the tower and still carrying out the objects of the Free Libraries Committee. Mr. T. Oliver said he had such a scheme, and put in a plan showing what he proposed. He said in his design he never contemplated removing the tower. He proposed going round about it, as he did in the case of the erection of the Mechanics' Institute, which he designed and carried out. In his opinion the tower should not be removed. It would cheapen the cost not to remove the tower. Mr. Fowler pointed out that Mr. Oliver's plan was not a correct one, and showed the discrepancies in it. Mr. Oliver said he knew the plan was not correct; it was only a rough sketch plan, but it was only a clerical error. He explained the mistake to the Commissioner when he put it in. The Commissioner said the dimensions could be easily altered; the building could be carried back a few feet. Mr. Fowler: The present Mechanics' Institute cannot be utilised with such advantage as it otherwise would be if you carried out Mr. Oliver's plan. The Commissioner: It is a question of degree on either side. Mr. Fowler then put in a plan showing the scheme recommended by the Corporation, and said he calculated that they would save from £5,500 to £6,000 if it were so carried out. Though it was not for him to say so, they should have also a very handsome building, which would be a great improvement to the town. Mr. Oliver remarked, in regard to his plan, that it was only a clerical error. He got the position of the tower, he might tell them, from one of the surveyors. Surveyors were not, he apprehended, more correct than architects. Mr. Fowler himself having made a mistake of some £10,000. Mr. W. H. D. Longstaffe next addressed the Commissioner, and commenced by reading a document from Mr. Johnson, architect, who submitted that if it were absolutely necessary to erect the Free Library on that site, it could be done so as to preserve the tower, and in a great measure the very valuable open space, by repeating, with

some modifications, the block plan of the Mechanics' Institute. Addressing the Commissioner, Mr. Longstaffe spoke of the line of the old wall round the town, and said its whole history was perplexing, and for this reason he did not want a single stone removed. He also contended that if the tower were pulled down it would offend several gentlemen who otherwise would make handsome presents to the Library. Mr. Gibson Kyle made some remarks in favour of retaining the tower, though had there been no tower he rather liked Mr. Fowler's plan. Mr. W. L. Newcombe, architect, said he spoke in support of Mr. Oliver's plan, first, as an owner of property in Higham-place; and, secondly, as an architect. The inquiry then terminated.

IRREGULARITIES IN INSTRUMENTS OF LINEAL MEASUREMENT.

IN a paper on "The Imperial Standard of Length for Free Public Use," recently read before the Institution of Engineers of Scotland by Mr. A. B. Allan, C.E., the author dwells at some length on the necessity of remembering and providing for probable inaccuracies caused by irregularities in instruments of lineal measurement.

Proceeding to the consideration of long instruments of lineal measurement, the chain may first receive attention. This instrument, whether 66ft. or 100ft. in length, is, from the nature of its construction, peculiarly apt to vary in extent. By the links becoming bent or the joints getting filled with dirt it possibly may be shortened, but either of these disturbances give rise to no very great error, and may readily be detected and removed. The real defects of the chain consist in its liability to elongation, and this arises from two distinct actions which cannot be ascertained by simple inspection, or conveniently set right by the engineering surveyor. These are the wearing of the surfaces which are in contact, and the opening of the joints. The wearing of the surfaces, never very great absolutely, may be relatively great or small, according to the weather during which the chain is used and the care taken in preventing rust. The opening of the joints, on the other hand, may lead to a serious stretching, and this is not to be wondered at when it is remembered that in a chain as usually made there are no less than 503 joints all capable of being opened, and which the using of the chain constantly tends to open. Of course, the extension due to such action increases with the continued use of the instrument, and the combined effect may be an error easily amounting to 5in. or 6in. on a length of 100ft. without the chain exhibiting any apparent symptoms of being out of order. While not prepared to propose a new construction of this instrument, Mr. Allan suggested that there is evident room for some improvement whereby it would be rendered much less extensible.

A course of careful observation leads to the distinguishing of three varieties of tape-lines depending upon the association of different degrees of stiffness, with ultimate strengths, which also vary. Thus there are (1) tape-lines which have small ultimate strength, with a certain amount of elasticity; (2) those which are strong and very elastic; and (3) those which are strong and stiff. The characteristics indicated under the first head are those possessed by inferior tape-lines of flimsy manufacture. The second variety, from its being of a stouter structure, is no doubt meant by the maker to be superior to the first, but is only so in point of durability, not of accuracy. The first loses its elasticity rapidly, and becomes permanently elongated to an extent eventually exceeding the range of elasticity. The second loses its elasticity less rapidly, and takes a set of elongation, increasing so gradually that the tape is most probably otherwise worn out before its elasticity is altogether exhausted. As regards accuracy of measurement both sorts are equally defective, because even with the most careful handling it is impossible to avoid error where there is excess of length or of elasticity in the measuring instrument. It is not uncommon to find a 50ft. tape-line, of the kind first referred to, too long to the extent of 1½ or 2in., after a short time's use. The range of elasticity of tape-lines of the second kind and same length is in some cases as much as 3in. Tape-lines of the third variety are practically inextensible, being stoutly made and devoid of elasticity.

Having thus classified these instruments according to their tendency to extension, it should next be mentioned that they are all liable to shrink on becoming wetted. The amount of this contraction depends on the condition of the surface of the tape-line and the length of time it may have been exposed to moisture. In a new tape, the surface being nearly waterproof, the shrinking is at first very little, but goes on augmenting as the surface becomes worn, until ultimately it may be as much as 2in. on a length of 50ft. However this shortening, although it may appear so at first sight, is in reality of little consequence provided it be observed and set right, as it readily may be by simply stretching the tape to its original length. But care should be taken that this is only done when the tape has been thoroughly dried. If this be attended to, there will be no tendency to shrink again until the tape is once more exposed to the influence of moisture. From the above considerations it becomes obvious that the requisites of a good tape-line are strength, stiffness, and a durable waterproof surface; and as there are no means whereby a tape-line, which is too long, may be brought back to lasting accuracy, it may be said of long instruments of lineal measurement, that contraction represents a temporary variation, whereas elongation is the result of permanent deterioration. Steel ribbon measuring lines, on account of the care necessary in manipulating them, can hardly be said to be in common use. They supply, however, a very reliable means of measurement, their only variations being those due to changes of temperature.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

THE ninth meeting of the session was held on Wednesday last; Mr. Syer Cuming, F.S.A. (Scotland), in the chair. Mr. G. Wright, F.S.A., detailed the progress of the arrangements for holding the congress at Great Yarmouth, and read the programme of places to be visited. Mr. J. Brent, F.S.A., described a cup of Castor ware which had been recently found at the Pan Rock, Whitstable, a site which has hitherto yielded only Samian ware, affording evidence that this remarkable spot was a storing place for Roman pottery, and not a manufactory. He exhibited also several bronze celts from Canterbury, &c. In the discussion which followed with respect to the pre-historic character of some of the articles, the chairman referred to the numerous pre-historic relics found near London Wall. Mr. Myers, F.S.A., exhibited a large collection of terra-cotta objects, collected by him in Asia Minor and Africa, including a photograph of a remarkable aqueduct at Algiers of early Arabic date, recently destroyed to make way for gas works. He was followed by the Rev. M. Maynard, who produced an interesting series of very early articles from Cyprus, among which were some of Egyptian date and style. Mr. Loftus Brock, F.S.A., exhibited a fragment of Gothic tracery work in stone, blackened by smoke, probably the result of great fire of 1666. It was found in some recent excavations at London Wall.

The first paper was by the chairman, and had for its subject the seasonable one of "Easter eggs." After referring to the derivation of the name "Easter" from the Teuton goddess, who was represented with eggs on her head, he traced the uses of eggs by many early peoples and races. In Christian times the Copts suspended them from the roofs of their churches. They are found in terra-cotta in Etruscan tombs; in England they were supposed to preserve the owners from mischief; in early times there is abundance of evidence that they were worshipped by the Celts, and a remarkable custom still extant in Brittany was dwelt upon. Several examples of much interest were exhibited, one with the emblems of Astarte and of Christ, another of iron, of Russian origin, with representation of the Ascension; and a third, of Kentish origin, which had been decorated gaily in colours. The second paper was by Mr. C. W. Dymond, C.E., who described with great minuteness the present condition of the "Hurlers" in Cornwall, and the two other supporting circles, there being three in all. The paper was illustrated by an elaborate plan, which will appear in the "Journal," showing the position of all the stones which now exist and their relation to each other.

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ILLUSTRATIONS.

DESIGNS FOR DECORATIONS, BY ALBERT DÜRER.—CARVINGS AT THE NEW PREMISES OF THE ART UNION OF LONDON.—SOUTH VILLA, REGENT'S PARK.—NEW BOARD SCHOOLS, HANOVER-STREET.—NORMAN TOWER, BURY ST. EDMUND'S.

OUR LITHOGRAPHIC ILLUSTRATIONS.

DECORATIVE DESIGNS BY ALBERT DÜRER.

CONTINUING our series from the drawings by the old masters, we publish to-day a reproduction from one of Albert Dürer's own drawings, illustrating some characteristic and spirited designs for decoration in the style of L. Della Robbia. The swag is suggestive, and the cherubs are full of good drawing and vigour. The want of perspective and uncertain way in which the architectural details are shown is quaint, but unworthy of Dürer. The original drawing was slightly tinted with flesh washes and tints of blue and pink to the drapery. The drawing was exhibited this year at the Royal Academy Exhibition of Old Masters, and belongs to Mr. Edward J. Poynter, R.A., who has kindly placed the drawing at our disposal for publication. Dürer's monogram is not given as here shown on the original.

CARVINGS FROM THE ART UNION FOR LONDON NEW PREMISES, STRAND.

A fortnight since we gave the upper and lower portions of the panels between the first or principal floor windows of this new building, and to-day, in obedience to our promise then made, we publish the central portions of three out of the set of four panels. We refer our readers to the remarks already given when the other details and general drawings were published in our pages. Messrs. Mabey, of Westminster, executed the carvings; and Professor E. M. Barry, R.A., is the architect of the building.

SOUTH VILLA, INNER CIRCLE, REGENT'S PARK.

THE Crown lease of South Villa was purchased by Mr. T. J. Waller several months ago. The former house was a work in the Doric style, by Mr. Decimus Burton, which had been added to at various times. After making some attempts in the direction of enlarging the premises, it was finally determined by Mr. Waller that nothing

short of rebuilding would suffice for his wants, and be worthy of the beautiful surroundings, and he instructed Mr. Gundry, architect, of the Adelphi, to prepare plans for the new house, which we illustrate by our double-page view with plan this week.

BOARD SCHOOLS, HANOVER-STREET, ISLINGTON.

One of the most picturesque schools which Mr. E. R. Robson, the architect to the London School Board, has built in London, is that which we illustrate this week. The building is situated in Hanover-street, Islington, and overlooks the canal, as will be seen by the view which we give. This is taken from the drawing which Mr. Robson exhibited last year at the Royal Academy. The style is characteristic of Mr. Robson's work, and the materials used are stock brick for the general walling, with red and cut brick dressings, and red tile roofs. The school provides accommodation for 264 boys, 264 girls, and 300 infants, making a total of 828 scholars.

THE NORMAN TOWER, BURY ST. EDMUND'S.

THIS fine example of Norman architecture formed originally one of the two principal entrances to the grounds of St. Edmund's Monastery; its erection was begun in 1117, and completed in 1130. The other gateway (now known as the Abbey gate), which was probably of similar character, was destroyed during the sacking of the Monastery by the townspeople in 1327, and rebuilt soon afterwards in later style. In the "Journal of the Archaeological Association," will be found a full description of the remains of this interesting Abbey, by Mr. Gordon M. Hills, and in the BUILDING NEWS of August 15th, 1869, a report of a paper on the same subject, read by Mr. Morant before the Royal Archaeological Institute when at Bury St. Edmunds. Our illustration is taken from a drawing by Mr. John W. Simpson, in last year's exhibition of the Royal Academy.

MR. WILLIAM MORRIS IN QUEEN SQUARE.

LAST week, the *World* sketched Mr. William Morris, the decorator and poet, at his studio in Queen's-square, in its gallery of Celebrities at Home. Mr. Morris is described as a middle-aged, thick-set man, broad and deep of chest, and with head curly as to hair and beard, decidedly handsome and barely silvered over. Turning from his easel to welcome the correspondent, Mr. Morris holds out a hand stained dark blue, protruding from the sleeve of a grey shooting-jacket under a wristband still more blue than itself. He explains "You see I dye all my patterns myself, and worked a long time at a dyer's in order to qualify myself practically for this important part of our work." Has he also mastered the art of staining glass? "No, we leave our glass work entirely to Mr. Burne-Jones. He knows so much more about it than anybody else; but I make not only designs, but actual drawings for upholstery, paper-hangings, and tile-work, and am very proud of my technical knowledge. It takes time, of course—but it is now sixteen years since we first began. As I have dyed at the vat, so I have passed months at the potteries, and flatter myself that I now know the capacity of my materials." Mr. Morris chats pleasantly as he works at the drawing on his easel. "You are speaking of imitators. We suffer far more from imitation than most people. Mr. Swinburne's imitators advertise him; our imitators take our property. They appropriate the schemes of decoration which are our real capital, and steal our very patterns. You are aware that in this country we can only register our designs for three years, after which they become public property. This time is too short. English people are slow to accept new ideas, and put off the evil day of submission as long as possible. Hence we find that, just as we have succeeded in introducing anything new it ceases to be our property. There is also the adaptor, who employs a vast deal of ingenuity in stealing the kernel of a design without the tell-tale husk which would bring him to grief. I wonder people are not ashamed—not of dishonesty, for that is common enough—but of their utter poverty of thought, the despicable sterility which compels them to follow the ideas of others in a slavish and tricky manner." Mr. Morris thinks that if art is to form a part of ordinary life in England the American system of patenting designs, so as to give the inventor a

fair chance of remuneration, must be adopted. At present he has to contend against abundant capital and technically clever designers, who are well paid for imitating his work. Amateurs and ladies are, however, in Mr. Morris's opinion, commercially harmless and only artistically a nuisance. Does he study from Nature and then adapt his work to the conventional forms he prefers for decorative purposes? During one period, he replies, he studied closely from Nature, but being endowed with a remarkably good memory for colour, form, and land-scape, he finds it unnecessary in a general way to proceed beyond its stores. For writing poetry or painting pictures he thinks the close study of Nature indispensable, but not so needful for decorative work. The son of a City man, but of Welsh descent, educated first at Marlborough School and then at Exeter College, Mr. Morris lit upon dull times at Oxford, and fell, like many of the young men of that day, into the ecclesiastical groove. It was the fashion just then for thoughtful undergraduates to fancy that they cared about architecture and decoration of the strictly Mediaeval pattern. The influence both of Rome and Ruskin told upon William Morris. After trying for the Newdigate and failing, he took a pass and drifted into Philistia. Before this he had prepared himself for active life by entering Mr. Street's office to study architecture as a profession. Following up this plan of life, he came to town, and devoted himself eagerly to architecture, decoration, and painting, and for five years published no line of poetry. His first volume had not been successful, and he worked at plans, pictures, and designs until he found, as he thought, his vocation in decorative art. To this he has been faithful for the last sixteen years, so far as the five working days of the week are concerned, Saturday and Sunday having been set aside for verse. Mr. Morris considers himself a fortunate and exceptionally happy man. His trade is not only profitable, but affords him infinite pleasure. His first little book, he candidly acknowledges, deserved to fail; all that he has written has brought him, he says with equal frankness, some accession of reputation, and he enjoys writing immensely—almost as much as he enjoys angling in the Thames by Leeclade.

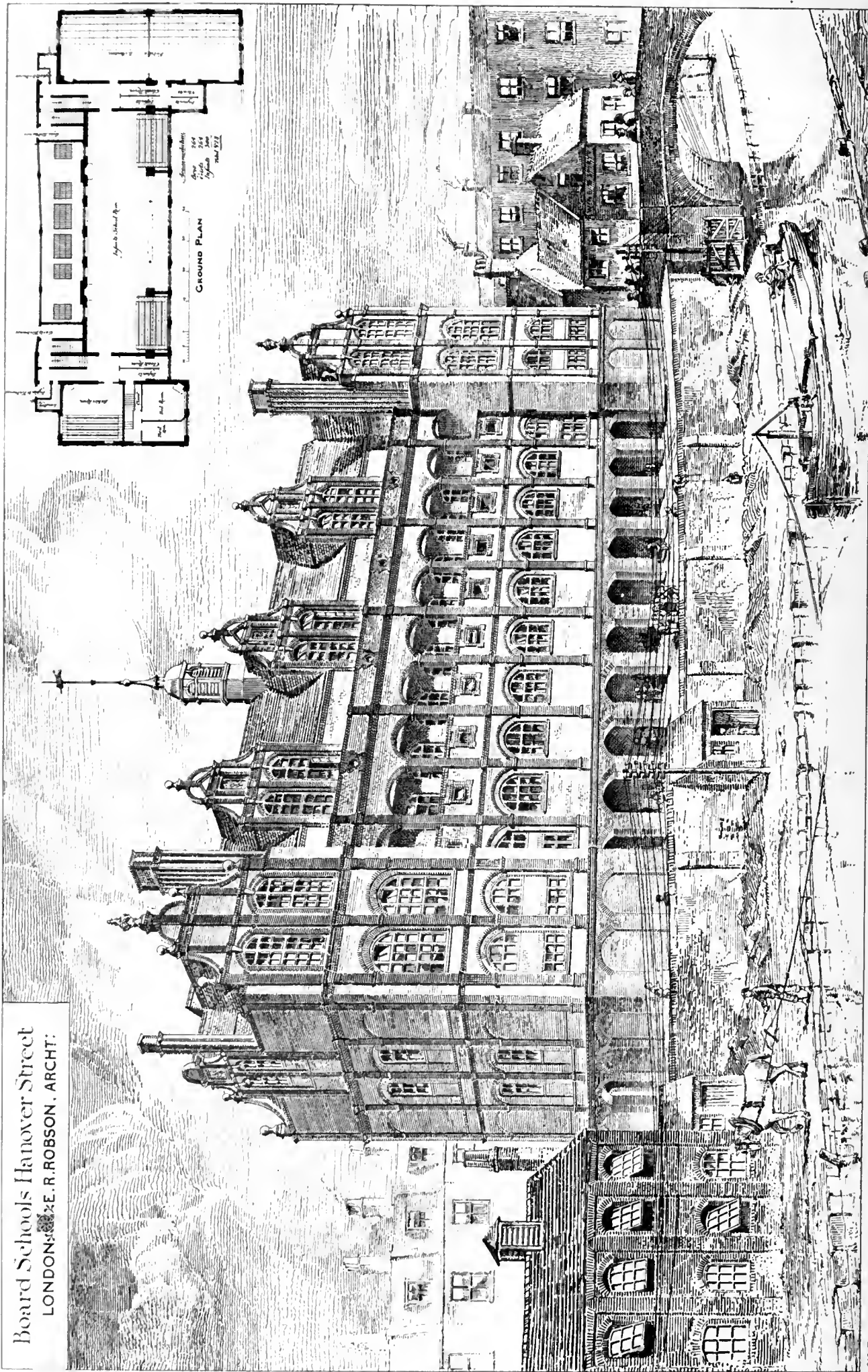
EXHIBITION OF GAS APPARATUS AT LEEDS.

AN exhibition was opened on Monday in the Victoria Hall, organised by the Leeds Corporation, and intended to illustrate the various economic uses to which gas may be applied other than for the purposes of illumination. So large was the number of applications from intending exhibitors that only about three-fourths of them could be accepted. The selection, however, seems to have been carefully made, and as a result we have a display of gas apparatus by between thirty and forty of the principal manufacturers in England, including a large representation of local enterprise. The arrangements have been carried out under the authority of the Gas Committee, presided over by Ald. Bower, and the preparations, involving a large amount of anxiety and labour, have been made under the direction of Mr. Woodall, Gas Engineer. The real object of exhibitions like the present is of course, to equalise the consumption of gas throughout the year, by encouraging its more extensive use for cooking and manufacturing. At present the consumption of gas in Leeds during winter is at the rate of about 6 millions of cubic feet per day, whereas in summer only about 1½ millions of cubic feet are consumed, although the expense of maintaining plant and meeting charges for interest continue throughout the year with little variation. Cheap as gas is already in Leeds (only 2s. 6d. per thousand cubic feet, with a discount of 2½ per cent. for prompt payment), it might be sold still more cheaply if fuller use were made of the manufacturing plant during the summer months, as would be the case if the advantages of gas for cooking were more widely known. The display, which has been conveniently arranged in streets along the floor of the Victoria Hall, includes all kinds of ovens and stoves, burners, brackets, and gaseliers, boilers, grills, kitchen ranges, stew pans, bread toasters, &c., many of which are shown in operation. Some of the heavier articles, and the engines working with gas as a motive power, are shown in the crypt of the Town Hall.

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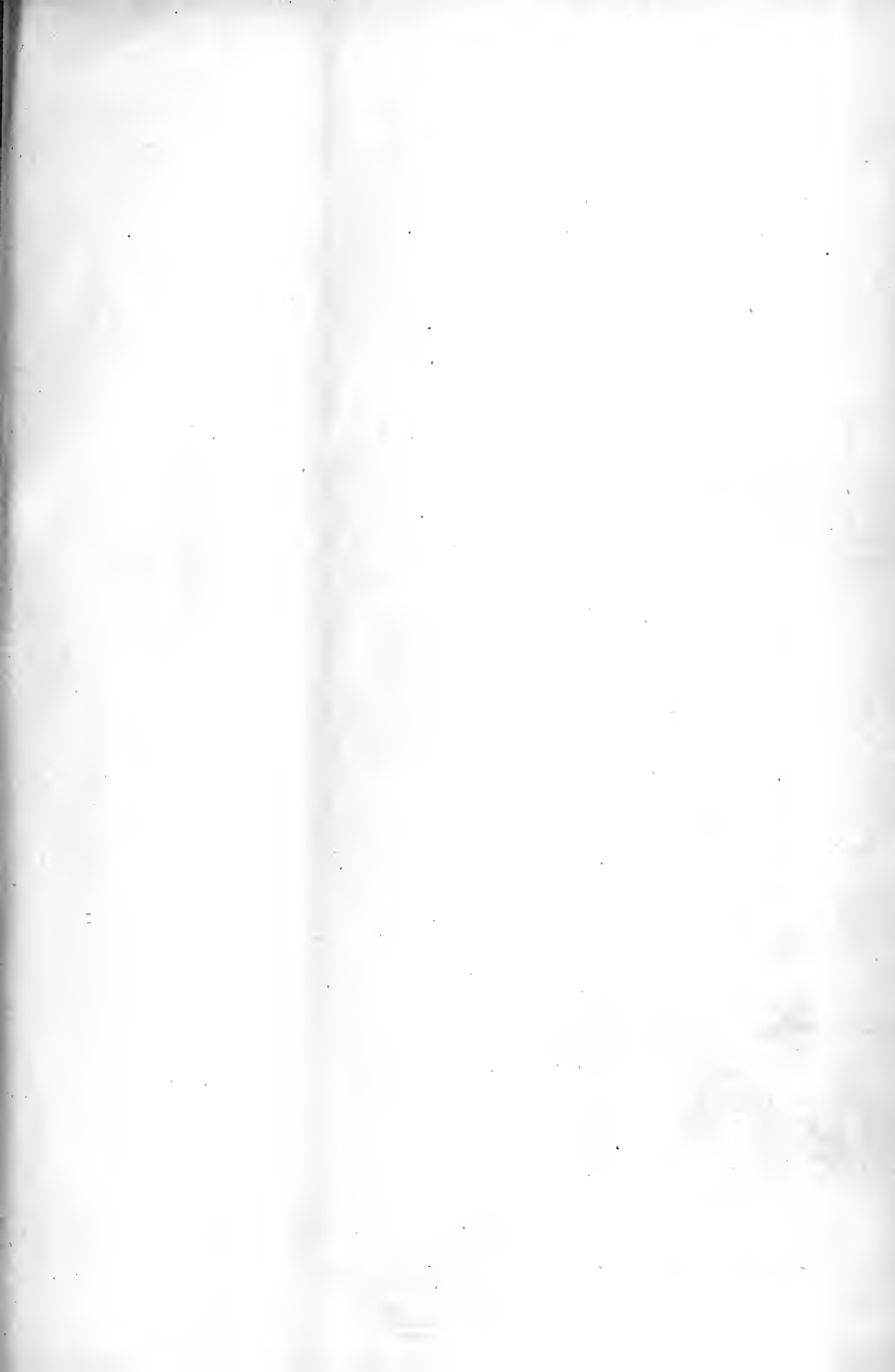
THE BUILDING DEWS APR 25 1879.

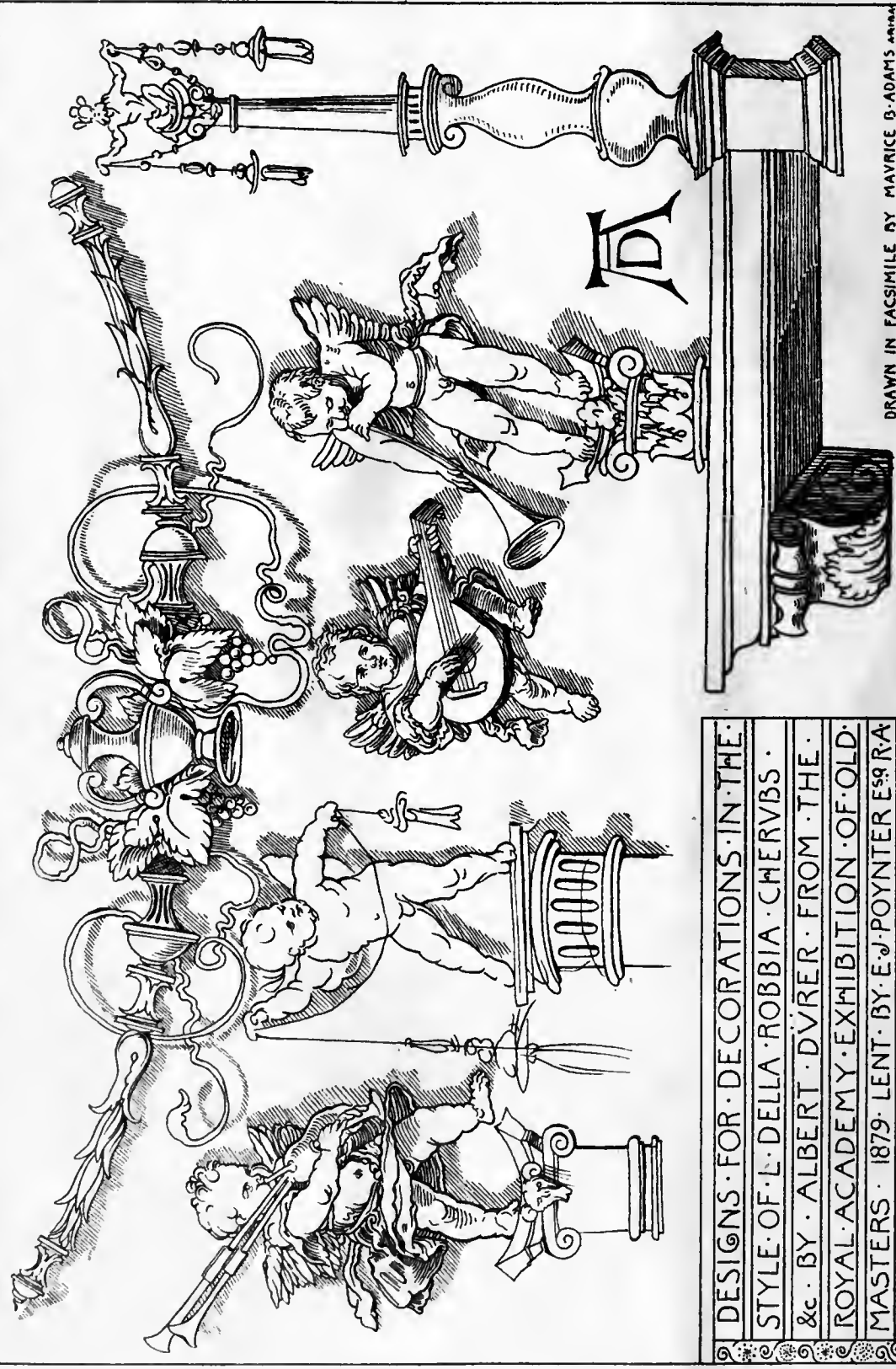
Board Schools Hanover Street
LONDON: E. R. ROBSON. ARCHT.



W. Roushworth del.

Photo Lithographed & Printed by James Edmunds, 5, Queen Square, W.C.





DESIGNS FOR DECORATIONS IN THE
STYLE OF L. DELLA ROBBIA · CHERVBS ·
&c · BY · ALBERT D'VRER · FROM THE ·
ROYAL ACADEMY · EXHIBITION OF OLD ·
MASTERS · 1879 · LENT BY E · POYNTER ESQ RA

DRAWN IN FACSIMILE BY MAVRICE B · ADAMS A · R · A ·

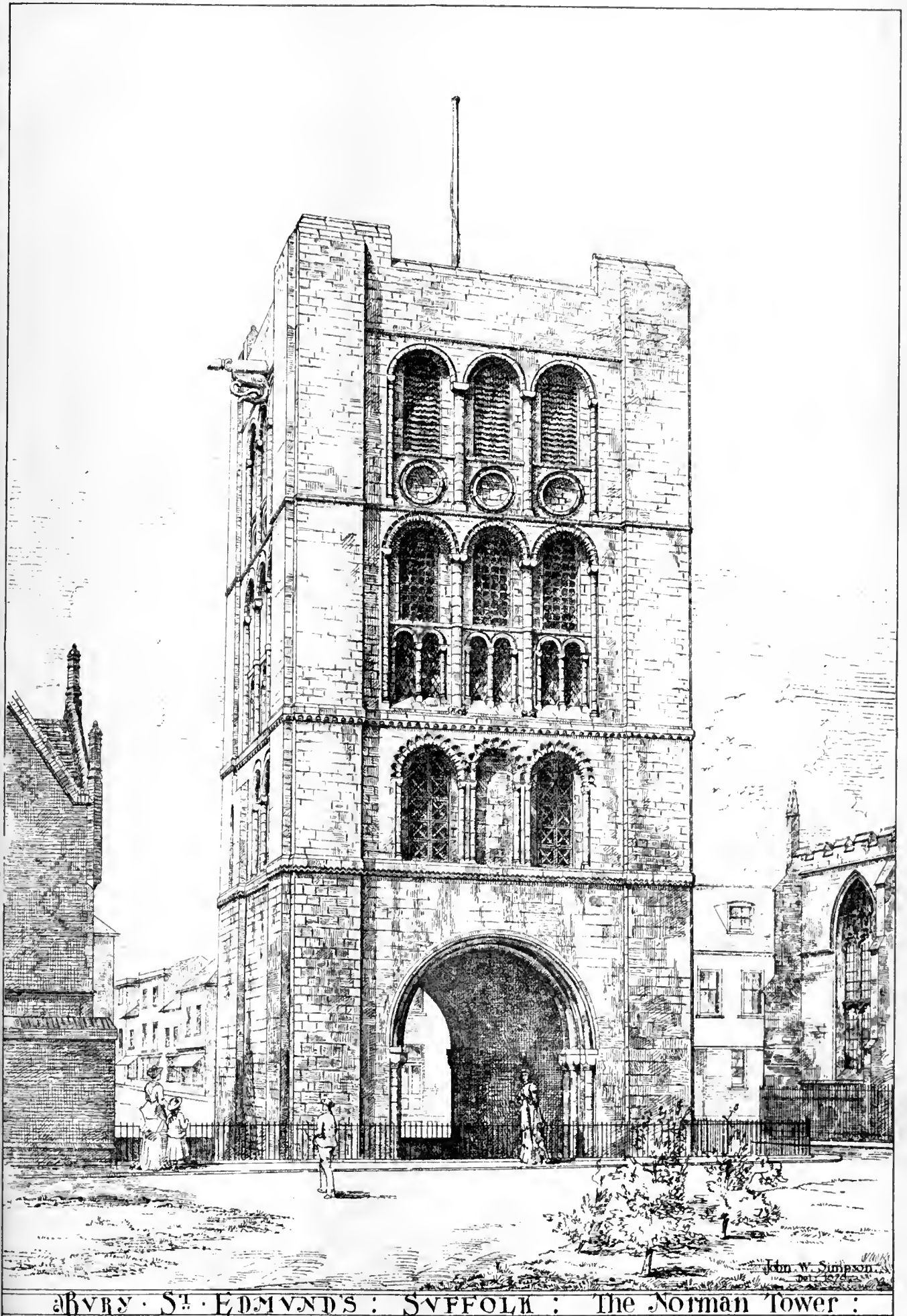


MAURICE B ADAMS DEL.



Photo-Lithographed & Printed by James Akerman, 6, Queen Square W.C.





ABURY · ST · EDMUND'S : SUFFOLK : The Norman Tower :

THE SHEFFIELD SCHOOL OF ART.

THE conversazione of the Sheffield School of Art took place on Wednesday evening in the school in Arundel-street. The address to the students was delivered by Mr. George Edmund Street, R.A., who also distributed the prizes. The exhibition of paintings in oil and drawings in water-colours is this year entirely confined to the productions of students. The Science and Art Department sent down a valuable collection of European and Oriental pottery, metal work, and jewellery, bronzes, and electro-types, as well as drawings, etchings, and photographs.

Among the students' works were the designs submitted in competition for a prize of twenty guineas, offered by the Duke of Norfolk, for a casket to contain the Mayor's chain. The design of the prize-winner, Mr. Ernest Thickett, represents on the front panel The Last Judgment, while on smaller panels at the side are figures of Mercy and Justice. The lid is surmounted by two figures holding a shield for a coat of arms. The design is intended to be carried out in silver, with gilded panels. The Mayor's Prize of £10 10s., for anatomical studies, has been awarded to Mr. Austin Winterbottom, who was also successful in carrying the Master-Cutler's prize of £5 5s. for the best design for fish-knives and forks. The Atlas Works Prize of £5 5s., for the best Study from the Life, is won by Mr. F. W. Bramhall. A prize of similar value, from the same donors, for Study from the Antique, has been carried by Mr. John Lawson with a painting in sepia. Messrs. Martin, Hall, and Co. offered £10 10s. for the best design for a claret jug and two goblets. The prize has been awarded to Mr. Stuart Thorpe, whose drawing was purchased by the South Kensington authorities. Mr. Longden's prize (£2 10s.) for the best design for a carved wood picture-frame has been awarded to Mr. Charles Wilson. There were 13 competitors for the Montgomery medal for a drawing of flowers and foliage in outline or shading from Nature. The prize was awarded to Mr. John Fisher, who elected to make a panel instead of a drawing. Miss Annie Yeomans was successful in obtaining a National gold medal for a design for lace-pocket-handkerchiefs, cravat end, borders, &c., painted in Chinese white on a black ground. In addition to the gold medal, Miss Yeomans carries one of two "Princess of Wales Scholarships," awarded to the two lady students who take the highest prizes of the year in the national competition. In this class Mr. Stuart Thorpe also gets a medal for the design for claret-jug and goblet, already noticed. Another silver medal is awarded to Mr. Charles E. Wilson for a design for a ceiling, for which he also obtained the first prize of the Plasterers' Company in London. A bronze medal is also awarded to Mr. John Fisher for his model which carried the Montgomery medal. Twenty third-grade prizes have been awarded to Sheffield this session.

An interesting exhibit in the room is the album presented to the Prince of Wales. On the fly-leaf is printed "Paris Universal Exhibition, 1878. Drawings of the British Section, by Charles E. Wilson, School of Art, Sheffield." It contains 18 remarkably fine water-colour drawings, representing the Princess of Wales's boudoir, the Picture Gallery, the Canadian Trophy, and other views of the more important departments of the Exhibition.

Among the pictures by past students, the most prominent work in the room is a painting by Arthur Wilson, representing one of the grand apartments in the Louvre. Mr. Wilson also shows several other works, among them "the Entrance to Henry VII.'s Chapel, Westminster," a view of the interior of the same chapel, and a painting of a young lady. Mr. R. Hudson, jun., exhibits a river scene, with trees; Miss Habershon, who won the gold medal two years ago, has a domestic sketch; Mr. Reed-Turner exhibits a hunting-scene, representing hunters pursuing sport under the difficulties of one of Kingsley's North-easters: "Glen Massen" is a representation of Argyllshire scenery; "The Old Oaks, Sherwood Forest," lent by Mr. T. Firth; "The Don, Wharfedale Side," lent by Mr. C. H. Firth; and "The Old Bridge and Lock on the Don, at Tinsley," are by the same artist. Prominent among the water-colours is a group in still life, by Miss A. M. Dickinson, which has obtained a national medal; a portrait by Miss Ellen Gilmore; a group in still life by Miss Biram; and

some clever sketches of local men, by Mr. W. J. Stevenson. "Boreatton Hall," drawn by Godfrey Sykes, is from a design by Messrs. M. E. Hadfield and Son; Mr. W. Fisher, J.P., lends several more of Mr. Sykes' works. Mr. Stevenson shows a case of water-colours, with sketches of the reading-room at the Central Free Library, views of Sheffield, &c. W. Topham has several pen-and-ink sketches, also water-colours, illustrating old houses in and out of the town, one being a view of the old hall, Norton Lees. Miss Biram has a sketch of Whitby Abbey, and another of the old mill at Ambleside. W. H. Pigot has several sketches, including some of Haddon Hall and meadows, lent by Mr. Manuel. Amongst other contributors are Miss Habershon; Miss Wornall, whose rendering of cathedral architecture is effective; Miss Seaton, Mr. R. G. Smith, Mr. Arthur Wilson, and Mr. Read-Turner.

Among the other exhibits were some designs by Mr. Edwin Page Turner for tile decoration, and Mr. J. Brook. Mr. William Ellis exhibits marble busts of the Rev. S. Earnshaw and Mr. H. C. Sorby. Mr. R. W. Brookes also has several busts, one of them a medallion. Mr. Harry Hems, of the Ecclesiastical Art Works, Exeter, exhibits his oak coffer, which was shown at Paris and Philadelphia.

Mr. G. E. STREET, R.A., previous to distributing the prizes, delivered the following address:—Your committee, in asking me to distribute the prizes which have been awarded and to speak to you this evening on the subject of schools of art and their work, have given me a task which is specially difficult, I am sorry to say, in my case, owing to my very slight acquaintance with the ordinary work and routine of such institutions. I have, however, willingly responded to their request, for my sympathies have always been with them, and I have hoped and still hope that by their agency, if at all, we English people might be redeemed from a general apathy about art which characterises the mass of the people in all modern European countries in some degree, but most of all those who, like ourselves, boast most of their progress and their advanced civilisation. It is indeed a truth about which we cannot have any doubt whatever, that there is a certain kind of civilisation which, whilst it raises some men, tends to debase the majority to a very low level in all matters of taste, and in all natural artistic development and expression. The reasons for this do not seem to me to be far to seek. The perfection of machinery, for instance, enables an enormous number of men to earn their living by perfectly adapting themselves to one process to the complete exclusion from their thoughts of all others. And such a mode of work involves, consequently, a loss of intelligence which is hardly compensated by the perfection to which the machine—and the man, as part of the machine—succeeds in attaining. The consequence is that at the present day it is to the workmen of some half-civilised country that one has to turn if one wishes to find an example of correct taste in colour, or form, or in the adaptation of both to material; and that these precious gifts are either in part or altogether lost when the uncivilised workman comes too much in contact with the civilisation of the ordinary workmen and merchants of our own country. If you wish to find peasants dressing themselves in such a guise as to make the very sight of them a delight to the eye you must go to some far-off valley remote from railways and from curious travellers, and not to any of the towns or districts which science or manufactures have made their own. In former days the surprising skill which we still see exercised by the makers of stuffs and carpets in those countries or by the fitters and enamellers in Japan, was evidenced just as completely in every work which proceeded from the hands of our own countrymen. And what is so remarkable is that nothing that they did was ever absolutely vulgar, hideous, or commonplace, or false in its mode of dealing with material or in its suitability for its purpose, and that, in short, they reached the same high common and universal standard of excellence that we now see reached by only a few nations throughout the whole habitable globe. The attempt to correct such a state of things as that which we have to deplore, follows naturally on the discovery or realisation of its existence, and though some of their supporters find the use of Schools of Art to be merely the raising of our people to the same power of drawing as some other nation—as e.g., the French—may have at-

tained, I venture to think that the real reason for their existence, and the real claim that they have on men who hold right views, are that they may tend, if rightly directed, so to open the eyes of the many to the perception of what is good and bad in art, as to bring us back in time to something like that universal sense of the true and the beautiful, which is not impossible, because, as we know, the people of this country, from the eleventh to the sixteenth century, undoubtedly possessed it. Of course there are many things which must be made, and which are nevertheless wholly outside our province. A plate for an armoured man-of-war, or so complicated a piece of admirable workmanship as a marine steam engine, does not admit of any kind of decoration; and a vast number of things may come under the same category. Broadly speaking, however, whatever is to be in frequent use and constantly before the eye may be an artistic work, and ought—if it is ornamented at all—to be ornamented well; and though there is no reason for stamping the plates for a boiler or for an armoured ship with good patterns, there is no reason whatever why the door of a safe, the front of a fire-grate, or the crane which raises goods to the top of the warehouse should not be all the subjects of careful thought and design—not to mention the whole of the furniture and domestic utensils in common use in every one of our houses. In this town you have, owing, as I am informed, to the zeal of your Corporation, a means of seeing how in former days almost all men's work was more or less excellent in its character and workmanship. The Weston Park Museum is one of which you may well be proud, and it contains so many examples of work executed in materials which are the staple of your own manufacture that I cannot sufficiently praise the zeal and liberality which have provided them for the improvement of the general knowledge and taste of your people. There you will be able to see how good and well designed a knife and its handle may be—how exquisitely the old German work was hammered in iron, and even the nails of a door were works of art; whilst candlesticks, plates, vases, and cups, chased, stamped, and wrought in charming fashion, were all to be studied there. Or if you wish for something still more refined, you have in the Bateman collection some beautiful examples of the delicate works of the early Irish artists, some of which have seldom been excelled in after ages. And if you want to know how even a thing which was never intended to be seen or exhibited was nevertheless made worth seeing, I commend to your notice the interesting lead coffin in the lower gallery. I augur great results from the constant opportunity of study afforded by this museum, aided as it is by such loan collections as that which you have here now from the South Kensington museum. I desire, in what I say this evening, to devote myself as much as possible to pointing out to you students what I, an older student, believe to be the right way of using the opportunities which such museums and schools of art afford you for cultivating your artistic intelligence. When you begin to study art, unless nature has been exceptionally bountiful, as she is only now and then to young students, it is necessary that everyone should accept a great deal upon the authority of the teacher. At first sight the difference between such sublime work as the sculptures of the Parthenon and the commonplace or affected sculpture of the later Romans may not be perceived. But if the student has been made to draw frequently and carefully from the former, it will almost always be found that he will be less disposed than ever to trouble himself about the latter; and the mere habit of drawing well and carefully from the life or from the purest antique sculpture gives a natural sense of the beauty of lines and curves such as cannot be obtained in any other way with equal certainty. And there is this great advantage in such work that as no line is a repetition of any other, and as no figure seen in the world can ever repeat its lines in any part, the hand and the eye are both being trained at the same time to the most perfect appreciation of form and line—entirely without that mathematical accuracy which produces monotony, and is the most certain evidence of poverty of invention, and want of artistic feeling that I know. The study of the human form is then for the draughtsman the most important study to which he can devote himself. Among other advantages, it will lead him certainly if

insensibly to indifference for some qualities which at the present day have great and the most noxious influence throughout this country. Many of you may think that accuracy of workmanship, exactitude to the minutest point of colour, line, and texture are indispensable in a good article. It is pardonable if you do think so, for the belief is well-nigh universal. But I venture very confidently to tell you that there are varieties within the best works as much as of the very worst, and that just as God makes every man and every animal unlike his brother or the rest of his kind, so the variety which is absolutely incompatible with exact accuracy of execution is really the highest quality which any of man's works can have. You must, therefore, train yourselves to believe that one of the main reasons for insisting on drawing from the life in these schools is that you may learn to depend upon your hand and your eye for everything that you draw and design; the more you do this the more certainly will your work have some good and precious qualities. There is nothing that had done so much harm, and is doing so much harm, to the art of design, as the too frequent dependence on mathematical drawing instruments. If a man wants to design an ornament he brings all his dividers and his bow-pencil. He divides out his ornament with an accuracy which aggravates us, and never trusts to his hand to draw a curve whilst he can get his bow-pencil to do one for him. The result is that his lines and his divisions being all perfect, the design has a tameness and insipidity which deprive it of all the interest which nature's irregular works invariably have. And here I must caution you against accepting as true the attempts which are ever and again made to prove that the best Greek ornament was entirely an affair of the bow-pencil. If you draw admirable curves with your hand it may often be found possible to find a succession of centres which will enable you to draw the whole curve with an instrument; but this is quite a different thing from the attempt to devise the curve with instruments instead of with the hand in the first place. Remember Giotto's round O, and the moral which the story teaches. The greatest artist could draw a complete circle without the aid of an instrument, and this perfect power is what you must first of all possess if your hand is ever to do its duty as the obedient servant of the intellect. I could give you any number of examples in illustration of what I have been saying. But these are hardly necessary, and I must ask you to take my word on this point. The extent to which this practice applies is endless. There is a very common mode of designing ornament to which young students are especially prone. They are too often in the habit of designing a portion of an ornament, and then, by the aid of tracing paper, reversing and repeating the lines already drawn. In this way an eighth of a circle is made to do service for the whole by a repetition which irritates in place of pleasing. Compare it with a good piece of Medieval workmanship, or of modern Eastern workmanship, and you will find that the virtue of the latter is that the hand has drawn the whole, and that no part is a mere repetition of another. In the one the attempt has been made to make a little labour go as far as possible. In the other the work has been a pleasure to the man who has done it, and his happiness in his work reacts on the man who looks at it in exact proportion to its evident reality. No doubt you have had before your eyes from time to time examples of old Venetian glass, and I am led to refer to it now as affording an admirable example of the way in which artistic work depends upon the education of the workmen. You all know that the aims of the Venetian glass-maker and of the English workman are entirely distinct. The latter conceives that absolute uniformity is the one condition of perfect work, whilst the former never troubled himself to obtain anything of the sort. The old Venetian glass has therefore always excited the greatest admiration, and collectors vie with each other in their eagerness to obtain specimens of it. In spite of this, modern fashions so far prevailed that even in Venice and Murano the old practice died out, and it was owing almost entirely to the exertions of a man of our own time—Dr. Salvati—that the old mode of working has been recovered. He set himself to make his workmen think for themselves, and the result is that I never visited any manufactory with a tithe of the pleasure with which I visited his works at Murano. For

there I saw a number of workmen making, often out of their own heads, and always without any guide or model before them, the most exquisite glasses, vases, bottles, and vessels of all sorts—no two of them alike—all probably deficient in accuracy of dimensions and shape, but all of them done with a life and spirit which can be secured in no other way. What Dr. Salvati has been able to accomplish at Murano we ought to set ourselves to accomplish here. He has converted his workmen into thinking beings, has endowed them with a new perception of the beautiful, and has shown that it is still possible to revive in the most real way those dormant powers which we are too apt to suppose to be impossible of revival. Something of the same sort of credit is due to potters who like Mr. Deulton have devoted themselves to the revival of the half extinct art of the potter, whose work when well and tastefully thrown from a wheel is always valuable and interesting. There are rough earthen pots in your museum which have become interesting owing to the varied handiwork of the workmen. The indifference to exactness which marks such works as these is equally admirable when good smith's work is to be done; for here if the work is wrought with a hammer it is really better in every way than the marks of the tool should be perceivable than that the work should have the dull neatness of cast work. This you can see for yourselves if you study and draw the German iron work—in your museum—which you owe to the munificence of Alderman Bragge. Let me now detain you for a brief space only on another equally important subject, that of colour. Here you may indeed obtain from your masters some general information, but to achieve success, you cannot depend on rules, and must again depend upon an eye cultivated by careful and constant study of good examples. It is true, however, that in this matter you must have a natural instinct or taste for what is good. No rules and no amount of study will suffice to make some men good colourists. In my judgment the greatest want of our day is a due sense of the value of breadth and tone in colour. Mere contrasts of one colour with another are never so satisfactory as the combining colours in such a way as to produce delightful general impressions of tone on the eye. Nature here is the best mistress. There are times when the landscape and foliage are full of the most delightful suggestions, and at all times it is a safe rule to observe the way in which colours are combined and gradated in natural objects—such as flowers and the foliage—if you desire to know how to produce the best effects. And let me add that in colour and texture, just as well as in outline, evenness and accuracy are not virtues. Look at a piece of really fine old stained glass, and you will see that no pains have been taken to secure evenness of tint in the white or ruby or green or blue of which it is made up. Look at a really good majolica tile, or at a good Eastern carpet or stuff, and you will always find the same rule observed. I shall now give you a few words of advice on the mode of study which you must adopt when you leave these schools, and have to work or study by yourselves. Your main object must be, as I have shown, to make yourselves masters of that art of stamping your own individuality upon your work which has always been the mark of good workmen. This can, I believe, only be accomplished by cultivating not only your hand, but by pursuing your studies till you have worked yourself into a state of enthusiasm about them. In all good artists there is something of the spirit of the fanatic. To them their own work is the first thing in importance and their own mode of doing it the one thing to be concerned about. Many-sided men are prodigies, and not often to be met with; and unusually it is better not to aim at too many accomplishments, but rather to devote yourself to the perfecting of one thing at a time at any rate. In our great towns the conditions of life, our surroundings, our dress, the very atmosphere itself, are all distasteful and distressing to the artistic eye. But all of you can occasionally, I hope, get away from these depressing influences; and there is one study which you will not be surprised to find that I think supremely important, and which few men have better chances of pursuing than you have in Yorkshire. I would have you, then, whenever you find it possible, make yourselves acquainted with some of the examples of our own ancient English architecture, of which the Yorkshire cathedrals, abbeys, and churches

afford such magnificent examples. I would advise you not merely to make the customary hurried and careless visit, but to sit down before them, to study their variations of style and detail, to read enough about them to be able to understand them, and finally to go to them sketch-book in hand. No study is more improving, or more interesting. And I believe that the accurate drawing of our own Medieval ornamentation and the detail will be found to be as good a training as any that can be suggested. The study of art is never so interesting, never so profitable as when circumstances allow you to see it under the conditions for which it was originally designed. We look at sculptures or paintings divorced from the buildings they were intended to adorn under the gravest disadvantages, and in your case, as with most of us in this country, it is in architecture alone that you can examine the artist's work under the very conditions for which he designed it, in purpose, situation, and surroundings. And, as I have suggested already, what I advise you to do is not merely to look at old buildings, but to make yourselves masters of something of their history, and to learn so much about the variations and development of style in architecture as to be able to distinguish one from another in a real way. It is possible for a well-educated man to say, within a very few years, at what date any of our old English buildings were erected. Try to learn to do this, and you will be quite astonished to find what a different country it is in which you move and live. Things, which to the ignorant man, or to the man without educated eyes were dull and lifeless, are replete with interest to him whose eyes have been opened to their value. You may say that this advice savours somewhat of mere antiquarianism. It is true that it does; but to know anything of any art, you must in these days know something of the art of former days, and that is to say you must be somewhat of an antiquary as well as an artist. When the South Kensington Museum sends you down a collection of examples of works in the precious metals, it is important that you should be able to judge with some accuracy as to the relation which each bears to the other. If, for instance, you are able to arrange them in their proper chronological sequence, and to tell the country in which they have been wrought, you will be able to see what it was that their makers were aiming at, and why new facilities of manufacture led to new forms or works of ornament. And if, when chance happens (as it does not very unfrequently now) to allow of your seeing galleries of pictures, the intelligent enjoyment of them depends not only on your being able to admire those with which you are most in sympathy, but equally in your being able to trace the influence of one master upon another, of one school upon another, and finally of the art of one country upon that of others. You have, no doubt, gathered from what I have said that the work before us is an up-hill business from beginning to end. Indeed, sometimes one feels disposed to despair about that general recovery of taste in this country which it is the object of schools of art to develop and foster. We see how gradually but certainly those old traditions are dying out which, even at the beginning of this century, had not lost their influence on some of our workmen. The country smith was constantly doing work which, being well executed, fitted for its purpose and natural in its treatment, had artistic qualities far above any which we can discover in much of the pretentious metal work of the present day. The country builder frequently also built a cottage or farm house, not wholly vulgar or commonplace, respectable in its honest use of materials, and, at any rate, substantial and useful in its way. And it is this quality of usefulness for the purpose which, in these and other similar examples, is that which most deserves to be noticed and remembered constantly by students. Without it no art is worthy of notice—and where it is the basis of ornament no art is wholly contemptible. In architecture, the first canon is that the building shall do its duty—first as being suited for its purpose, and next as being well and soundly constructed. And what is true of architecture is true of every other kind of work. I remember how Mr. Gladstone, when he lectured on Wedgwood's work, observed on the admirable shape of his plates, so perfect, that he did not doubt the cheese for which a dish was made must have joyed to find itself on so suitable a stand. So if you want to design a cup you must make it of such a shape as will allow of its

being easily drunk out of. Compare a chalice of the middle ages with one of the last century. You will find the former always usable with ease, the latter hardly capable of use at all. Then having got the most useful shape, the object ought to be to ornament the form, and not to conceal it. You should also always endeavour, as far as possible, to let everything explain its use easily; and not follow the example so frequently set now of concealing as far as possible the object, under some silly application of a form or thing with which it has nothing whatever to do. People nowadays hardly allow anything to do its work in a natural way. Even in our gardens a flower is not allowed to grow and flower in a natural way, but must be massed with so many others in what is called a ribbon pattern, which is simply a device for destroying all idea of nature's growth and beauty, and is an unhappy evidence of the bad taste which inflicts such mistakes on the grandest gardens, and leaves to the unsophisticated cottage garden the credit of being the only place where the old and natural use of a flower garden can be seen. Time would fail me this evening if I were to attempt to show you all the bearing of the rules I have suggested to you, and my object is rather to leave you to carry out for yourselves the principles I have mentioned, than to attempt the impossible task of giving a list of examples of their application. I have said nothing hitherto about the study and imitation of natural objects as suggestive of decoration. This is, however, a matter of extreme importance, and to which, no doubt, the attention of most of you has been called at some time or other. There are two ways of using nature in art. The one is the copying her exactly, the other is the giving a conventional imitation of her. The direct copying of natural objects is obviously proper in certain works. If you are painting a picture you must make your tree, and your rock, and your wave as like nature as you possibly can. But as it is wholly impossible to represent every leaf, every line of stratification, and every particle of foam on every billow, you are forced to a sort of conventional treatment which will enable you to produce the general effect on the eye of the things you undertake to paint. If, however, your object is to use a natural form for some purpose of decoration, as it is wholly impossible to make the work absolutely like nature, it is better frankly to accept the conditions, and boldly to give a conventionalised representation of it. Take a leaf, and you will find that its leading features are its outline, the lines of its fibres, and the way in which it grows out of the stem. Your conventionalised leaf must give you the essence of these three facts in the simplest way and with the least complexity. It was in this way that the Greeks used foliage for the decoration of their buildings, and without any knowledge of their work, it was in the same way that the best Medieval English sculptors treated the ornament of their buildings. Descend from this higher kind of work and consider how you should make use of natural objects in the design of a wall paper, of a piece of stuff, or of a merely decorative design for any flat ornament, and you will find the same rule apply. You cannot absolutely imitate nature without her texture and her tints, and therefore you ought not to make the attempt. Such works as that of Grinling Gibbons, admirably skilful as it is, must be condemned where it is used as an applied decoration of a building; for, in the first place, it is not an ornamenting of a necessary feature; and, in the next, is not really a *fac-simile* of the natural object it pretends to repeat. No caution is more necessary than this, for just as nothing is more easy than the making ornament by the combination or repetition of natural forms, so nothing is more common now-a-days, and perhaps it is not going too far to say also that nothing is more contemptible. I have said enough, I hope, by this time to show you not only how much there is to be done by students of art, but equally how difficult it is to do it. Let me give you one or two encouraging suggestions. Your Sheffield School of Art, if it does its work well, may aid in what, believe me, is of vital importance to art; it is adding one more to the local centres which are necessary if the provinces in our time are to be permeated with any proper and universal feeling for art. Such centres existed of old, and from one of them at Norwich, in the middle ages, proceeded a vast number of workmen, painters, carvers, makers of stained glass, and so forth, of whose works so much remains still in the Norfolk Churches as

to inspire one with the greatest respect for their taste and skill, whilst from another came the architects of your Yorkshire Abbeys, buildings hardly second to any in the world. In Italy, every considerable city was, of old, the centre of a school of art, and just as these local centres lost their life and power, the influence of individual painters or clusters of painters waned away, and a country in which every one was at one time an artist has become one of the most debased and backward in its art. Fortunately, revivals are possible. An art dies out altogether, is forgotten, and then, after ages of disuse, again springs into existence and flourishes. Let us hope it may be so here. But let me warn you that the conditions are hard. No man can do anything worth having without love and enthusiasm for his work. These may, however, be cultivated and developed. He can do nothing if his work does not bear the impress of his own thought and his own hand. The human character of all work is the one enduring interest it possesses. The work of a crowd of men, all obeying the orders of one, is, after all, mainly, if not solely, the work of the one whose orders are obeyed. The workmen who built a pyramid are no more to be admired than those who spend their whole lives in making pins; they have, indeed, been less usefully employed. But the workman or the student who has made one really good, original, truthful, and suitable design, has done a good work, for which he deserves all our thanks. May I be allowed to hope that in course of time some of you may find it in your power to do such work, and that all of you will endeavour to make the most of the teaching afforded by this school by training yourselves to admire and properly esteem all good work and to distinguish what is true in art from what is false, and by doing what lies in your power to stem the tide of bad taste and bad work with which on all sides we seem in these days to be inundated. Two reasons may be given for those who advocate schools of art in the centres of manufacturing industry. That which is the least worthy shall be given first. It is that, with a mere view to trade and to profit, to the sale of our goods and competition with rivals, an artistic training of the people cannot be dispensed with. If we ignore the value of the artist's aid in our manufactures others will not, and in the end we shall lose any pre-eminence that we already possess, or fail in the attempt to rival those who have already gained it. From this merely mercantile side, therefore, there can be no doubt of the interest which the manufacturer has, and ought to show, in such institutions. The second reason is of a far higher order, and will commend itself, I am sure, to the generous sympathies of young students such as those to whom I am speaking. It is that where so little is bright or beautiful about them there is no happiness so great as that which may be secured by the artistic culture to which they may here devote themselves. It is not the mere love of gain that will ever make an artist. It is the love of the beautiful and the hatred of what is hideous that lies at the bottom of all a man's real success in art. Devote yourselves heart and mind to art with such views as these, and you will be rewarded by the conviction that you have not only made yourselves happier, but have also given fresh interest and happiness to the lives of those who see and profit by your work.

A vote of thanks, proposed by the Mayor and seconded by the Master Cutler, to Mr. Street for his admirable address was carried by acclamation, and another vote of thanks to the Mayor for presiding concluded the proceedings.

THE AMALGAMATED HOUSE DECORATORS AND PAINTERS' SOCIETY.

THE sixth annual report of the Amalgamated Society of House Decorators and Painters has just been issued. The general secretary, Mr. Shipton, says:—"Fellow members,—This, the sixth annual report of our society, although not showing so much prosperity as in former years, affords us considerable ground for satisfaction. The past year has been one of unprecedented depression in every industry, and, of course, our own included. It has been a most trying and critical period for all trade associations, and yet the position of our society at the close of 1878 gives solid evidence of being able to pass through crucial difficulties, and yet have the capacity to

effect a great pecuniary improvement. During the past year our total income has been £1,000 13s. 1d., which added to the balance in hand at the close of 1877 of £989 9s. 4d., makes a total of £1,990 2s. 6d. From this sum we have expended for sickness £211 6s., and for funerals of members and members' wives £63, making a total for these benefits of £274 6s., and for other purposes £403 5s. 7½d., making a total expenditure of £677 11s. 7½d., and therefore leaving us at the close of 1878 with a balance in our general fund of £1,312 10s. 11½d., being an increase during the year of £323 1s. 6½d. In consequence of the severe and continued stagnation of every trade in the South Wales district, it has been necessary to close the Aberdare, Merthyr Tydvil, and Rhendda Valley branches, as the members had been forced to leave their homes in search of employment in other places.

"We have, however, opened a new and flourishing branch in Eastbourne, and efforts should be made in every town to open new branches in neighbouring localities where they do not exist. The exceptional prevalence of privation through want of employment is made tolerably clear by the fact that during 1877 the expenditure for sickness and funerals exceeded by £68 7s. 9d. the expenditure for the same purposes in the preceding year. After passing through the unusual vicissitudes of the twelve months just completed, we have 21 branches, 700 members, and £1,312 10s. 11½d. in our general fund. It is to be regretted exceedingly that our members have fallen off in number during the same period; but when we remember what serious losses in members and funds so many other societies have had to experience, in addition to heavy trade disputes, and, in too many cases, reduction of wages, it should be gratifying to us to know that we have thus far sustained our funds and made over £323 profit during the year. Should a period of reaction fall upon the building trades, those who leave or remain aloof from their trades organisations will be responsible for any calamity which may befall us through their criminal indifference to the only means by which their just interests can be sustained or their general welfare as men be effectively protected. On every hand, throughout the entire country, the prospects are indeed gloomy for labour. If these who are engaged in industrial toil fail to do their duty to themselves and protect their interests with an organised defence, then let senseless regrets cease, when by apathy they court the disasters they might easily prevent. In the revision of our rules it will be our duty to make such changes as may admit the local societies to become, with great advantage to themselves and others, part of our association; and that before the close of another year we shall have the great satisfaction of showing by our next report such an acquisition of members who, by their ability and influence for good, will enable us to place before the trade the position of an organisation which, for extent, solidity, and useful power will be unprecedented in our history."

TRAMWAYS.

AT a meeting of the Society of Engineers, held on Monday evening, April 21st, in the Society's Hall, Victoria-street, Westminster, Mr. Joseph Bernays, Vice-President, in the Chair, a paper was read by Mr. J. L. Haddan, on "The essentials which should govern the Construction and Working of Tramways." The author observed that when tramways were first introduced, they were a great advance upon the ordinary roads, but that the modern improvement of roadways had, in the present day, led almost to a reversal of the relative positions of road and tramway. In America, the tramways were superior to the roads, because the latter were sacrificed to the former. The tram-rail there, moreover, was available for the moderate ordinary traffic, while the speed of the tram service was about 20 per cent. greater than in this country and on the Continent. Mr. Haddan alluded to the general tendency to employ wood in roadways, and he described a system of construction by which a road could be made with a perfectly flat surface, and yet be well drained, and which should have the tramway incorporated with it. The tram-rails, he said, would be of wood, and the roadway would be kept surfaced with grit, so that the wood would not form the actual wearing surface. This system of tram and roadway, the author observes, would be homogeneous, and

would combine the best possible road for ordinary vehicles, with a perfect tramway for special carriages at less cost than the present method of construction. The author condemned the indiscriminate introduction of railway and omnibus principles into the construction and working of tramways, and described his proposed arrangement for meeting the requirements of a tramway service. This consists of a locomotive engine to be worked by steam and air, the steam being used for compressing, during the journey, its own supply of air as well as that which supplies the continuous motive power for propelling the cars. By reversing, the same driving mechanism acts as a continuous brake, and the same system is so arranged that the driver constantly feels the pull of the train upon a regulator handle. The withdrawal of his hand from this handle is to instantly cause the steam-power to block the train. Thus the brake mechanism would always be in action, instead of lying dormant as in ordinary continuous brakes. The author, in conclusion, stated what, in his opinion, were the technical, physical, and administrative requirements of mechanical traction on tramways generally.

SOCIETY OF ANTIQUARIES.

THIS Institution, pursuant to ancient customs held its anniversary on Wednesday (St. George's-day). The President, the Earl of Carnarvon, delivered the inaugural address. It was his duty, and he did it with sorrow, to mention the loss by death of nineteen members. Among these were Baron Heath, Canon Raines, Mr. W. S. Walford, and the Rev. J. G. Joyce. He then glanced at the events which had more immediately affected the Society during the past year. The first was the discussion with respect to the roof of St. Alban's, with the results of which, he thought, the Society might rest perfectly satisfied. Of the part he had himself taken, he would say nothing; but of Mr. G. E. Street's paper, laid before the Society at the opening of the session, he ventured to affirm that it had remained unanswered, and was, in fact, unanswerable. Whatever the result might be, we could afford to look on with a quiet conscience. His lordship then adverted to Sir John Lubbock's Bill for the Preservation of Ancient Monuments. He could quite understand the objections felt to the exclusion from the office of Commissioners of the Society of Antiquaries for England, of the Society of Antiquaries for Scotland, and of the Royal Irish Academy for Ireland, and of the supersession of one and all of these bodies by the trustees of the British Museum. But as her Majesty's Government had made it a *sine quâ non* that those trustees should be the Commissioners, he felt it would be unwise, as at present advised, to imperil the safety of the Bill by opposition on that ground, and he had therefore consented to take charge of the Bill in the House of Lords, and he hoped the Session would not pass without placing on the Statute Book an Act which might exercise a beneficial influence on the monuments of pre-historic Britain. Turning from the past to the future, Lord Carnarvon proceeded to pass under review some of the objects which he thought this society might with propriety, if not achieve, yet keep in view. Of these, not the least important was an archaeological survey of Great Britain. Nothing, he thought, could more effectually promote the preservation of pre-historic monuments, or facilitate the working of Sir John Lubbock's Bill. After entering into details on the facts which such a survey should embrace, Lord Carnarvon expressed a hope that this great work might be undertaken by the society with the aid of a grant from the Government, and with the use of the materials collected together by the Ordnance Survey. Nor was this the only work which, in his judgment, the society might fitly accomplish. No country, except Italy, was as rich as we were in charters, and yet we were the only civilised community that possessed no national *Codex Diplomaticus*. Everything extant ought to be printed, at least down to the region of Edward I. Then, again, if it was too much to expect what he considered was a great desideratum—a new edition of Dugdale's "Monasticon"—yet a complete series of the chartularies of the various abbeys would be a most useful work, containing, as they did, a mine of information on the social and economic history of this country, and which, if printed in *extenso*, would be put beyond the

risk of destruction by fire. Lord Carnarvon proceeded to show what valuable work might be done in editing the pipe rolls, the subsidy rolls, the episcopal registers, the municipal archives, and other documents, and then expressed a hope that from time to time as occasion might arise, and as the funds might allow, the Society might turn from the labours of the pen to those of the spade, and might contribute—as they had last year contributed to General Lane Fox's excavations—to the encouragement of original explorations conducted on systematic and scientific principles. If it be asked, where are we to find the money for the various schemes he had named in his address, he ventured to think that for any object really national an application to the Treasury would not be made in vain. It would, perhaps, be less easy to answer the question, Where are we to find the men? The labourers are few; and thankful should he be if any words of his could stir up the eminent men among those whom he was addressing to add in the manner indicated to their reputation and to the reputation of the society; but it was also not beyond the sphere of his duty, as he ventured to think, to remind the Fellows how important it was in adding to the members to insist on a high standard of qualification, and to exercise care and discrimination in proposing candidates for election. It was thus, and thus only, that they could gather and keep together a band of men who, in the words of the "obligation," which every Fellow subscribed on his admission, would "do the utmost in their power to promote the honour and interest of the Society of Antiquaries of London."

BLACK MILDEW ON ST. PAUL'S CATHEDRAL.

AT a late meeting of the Philadelphia Academy of Natural Sciences, Prof. Leidy remarked that an English periodical had recently ascribed the blackness on some portions of St. Paul's Cathedral to the growth of a hitherto undescribed lichen, which would appear to flourish only on limestone, and in situations unaffected by the direct rays of the sun. Prof. Leidy stated that his attention was called many years ago to a similar black appearance on the brick walls and granite work of houses in numerous shaded streets, especially in the neighbourhood of Delaware river. Noticing a similar blackness on the bricks above the windows of a brewery, in a more central part of the city, from which there was a constant escape of watery vapour, he was led to suspect that it was of a vegetable nature. On a microscopical examination the black mildew in this case proved to be alga, closely allied to a species which he took to be the well-known *Protococcus viridis*, and which gives a bright green colour to the trunks of trees, to fences and to walls, mostly on their more shaded and northern sides, everywhere about Philadelphia. Probably it may be the same plant in a different state, but until proved to be the same it may be distinguished as *P. lugubris*. It consists of minute round or oval cells, isolated or in pairs, or in groups of fours, the result of division; or it occurs in short irregular chains of four or more cells up to a dozen, occasionally with a lateral offset of two or more cells. By transmitted light the cells appear of a brownish or olive brownish hue. In mass and to the unassisted eye, the alga appears as an intensely black powder. Can this, asked Prof. Leidy, be the gonidial alga of the undescribed lichen of St. Paul's?

ASPHALTE AND TIMBER FLOORS.

A CURIOUS method of laying down floors has been adopted in France, and is said to have obtained a wide application. It consists in putting down flooring, not as hitherto, on joists, but in embedding the boarding in asphalt. The new floors are used mostly for ground stories of barracks and hospitals, as well as churches and courts of law. Pieces of oak, usually 2½ to 4 inches broad, 12 to 30 inches long, and 1 inch thick are pressed down into a layer of hot asphalt not quite half an inch thick in the well-known herring-bone pattern. To insure a complete adhesion of the wood to the asphalt and obtain the smallest possible joints, the edges of the pieces of wood are planed down, beveling towards the bottom, so that their cross-section becomes wedge-like. Nails, of course, are not necessary, and a perfectly level surface may be given to the

flooring by planing after the laying down. The advantages of this flooring, which only requires an even bed on which to rest, are said to be the following:—

1. Damp from below and its consequence, rot, are prevented.
2. Floors may be cleaned quickly and with the least amount of water, insuring rapid drying.
3. Vermin cannot accumulate in the joints.
4. Unhealthy exhalations from the soil cannot penetrate into living-rooms. Asphalt being impermeable to damp, rooms become perfectly healthy even if they are not vaulted underneath. In buildings with several stories, as in hospitals, the vitiated air of the lower rooms cannot ascend, an object which it has hitherto not been possible to attain by any other means.
5. The layer of asphalt will also prevent the spreading of fire from one floor to another in case of conflagration. The flooring here described has been laid in the numerous casements of the newly-constructed forts round Metz, to the satisfaction of the authorities. The cost is about a shilling per square foot. This estimate, somewhat high, would be much lower in districts where oak and labour are cheaper, and the distance from the places of construction less, and especially where there is more competition among contractors than at Metz; and the cost for larger undertakings may be reduced to eight shillings per square metre.

THE IMITATION OF WOODS AND MARBLES.*

IT is useless to preach a high-art doctrine such as that which forbids imitation of natural products, so long as a large and respectable class of our artists practise a style of decoration that is still extensively admired by the public. The question with us now is not whether painted imitations of woods and marbles, such as that produced by painters in "graining" and "marbling," is a legitimate means of decoration, still less a rational one. Such a question we should be obliged to answer in the negative. It is enough for us to know that thousands of our best decorators are so employed, and that many of our best buildings are decorated in this manner. Such being the case, we open the large folio now upon our table, entitled "School of Painting for the Imitation of Woods and Marbles, as taught and practised by A. R. Van der Burg and P. Van der Burg, directors of the Rotterdam Painting Institution, illustrated with numerous engravings and chromolithographs," many of them marvels of imitative skill. The book purports to be a complete course of instruction in the art of imitating wood and marble according to a certain method. The method of the Messrs. Van der Burgs may be summed up as founded upon a close examination of the effects of the light upon various grains; that, in fact, the colour changes its hue according to the direction of the rays of light falling thereon. The authors observe that, "if we take a piece of wood well polished and turn it round so as to make the light fall upon it from different sides, we shall at once perceive that its colour takes different hues, and the so-called 'shine' changes its place, and we may equally convince ourselves that the grain remains unaltered, whilst the 'parties' of light and chief colours, though remaining the same, change their places." The grain, in short, is not dependent upon the colours of the species of wood, but the colour changes its place according to the grain. The tools used are of a special kind, and are illustrated, the authors offering to supply any that may not be procured. It will be unnecessary to say that the work is enriched by numerous examples of imitative painting; there are 36 plates of chromolithographs, with detailed descriptions and explanations of the preparation of the colours and processes of working. Walnut is one of the woods shown. For painting it the primitive colour is composed of white, yellow-ochre, and Turkey or Prussian red. In the process of graining, the palette is filled with colours in the following order: black, Cassel earth, burnt sienna, raw sienna, and a little Prussian blue; the black is ivory black. The graining-brush is flat, with a short handle, and is held in a slanting direction, very slightly raised above the board; it should not be over-

* School of Painting for the Imitation of Woods and Marbles, by GEBR. A. R. & P. VAN DER BURG, Rotterdam. London: Crosby Lockwood & Co., Stationers' Hall-court.

charged with paint, and the side or point of brush should be filled with the darkest hue. Besides the graining-brush, the stiff brush, a comb, sponge, and washleather are employed, the latter to take off the superfluous liquid, or paint from the brush. The several positions the brush should be held in drawing the grain are illustrated, and the authors show that every grain has its beginning and end, with few exceptions; that is, the grain remains uninterrupted, and one curve follows another. We cannot, without diagrams, show the methods adopted to give the effect of oval-shaped veins, but the main secret is to fill the brush only slightly with paint, and draw the grain with the sharp corner of the flat brush. The examples of walnut, plates II., III., are wonderfully true to nature; we may also refer to the specimens of juniper-tree imitation as excellent reproductions. Mahogany, maple, ash, and other varieties are given. But the marbles are perhaps even more faithful as renderings. Thus, we have Brèche (Breccia) marble imitation in which the grey, violet, red veins, and angular crystalline masses are cleverly reproduced. Speaking generally of marble imitations, the authors say, "The paints for marble painting are mixed rather thick, with raw linseed oil; in winter, or in the open air, a little boiled pale linseed oil ought to be added, especially when slow-drying paints, such as marmum caput or coleothar, jet black, &c., are used." Paints should be sparingly used, both for facility of working and durability. Poppy-oil is recommended for the finer sort of work, as more durable, but linseed oil for outside work. The palettes for various kinds of marble are given in detail, and the *modus operandi* explained. Specimens of St. Remi marble (plates V. and VI.) are very fine; different species of white marble, such as Carrara, that from Arabia, Spain, Greece, and Italy, are given, all distinguishable by connoisseurs, by the colour and grain. Sienna marble, Vert de Mer, Waulsort marble, &c., are also beautifully illustrated and treated of in the work before us. The Waulsort marble, plate 36, is a masterpiece of imitative art and chromolithography. It may be of value to remember in wood graining, that the broadest grain lies near the heart, and becomes gradually finer, so that the coarsest comb should be used first, and then the finer by degrees. In fact, there is more rule and method in wood-graining than in marble imitation, in which materials the veins and crystalline ingredients are found embedded in the most capricious manner.

Some useful hints on outdoor painting are given in the Appendix, which, however, we find is introduced in two different places in the book, and the order of the descriptions of wood and marble imitations is somewhat irregular. To prevent cracking, the primings should be made thick; for "if oak or deal be covered with a coat of paint mixed with nothing but boiled oil, experience teaches us that the results will be bad." Brown ochre, mixed with raw linseed oil and turpentine, is said to produce good results as a priming coat. The priming for wood painting should not be too dull, or it is not easy to work upon; for marble painting it is recommended to be thin, and mixed with more turpentine. Some suggestive remarks are given at the end about ceiling and wall-painting. We take leave of Messrs. Van der Burg's work with the conviction that it will be usefully studied by all those who imitate wood and marble, as a comprehensive and somewhat scientific guide to the art. The explanations of the processes, the manipulation and management of the colours, and the beautifully executed plates will not be the least valuable to the student who aims at making his work a faithful transcript of nature.

THE PARISIAN SEWERS.

SOME particulars are given by Russell Sturges in the *New York Nation*, of the great department called "Service de la Vie Publique"—Street Department, in short—which includes within itself a number of "services" which have little in common with the streets. This department makes a wonderful show of itself, its structures, machines, discipline, and organisation. There are models on an enormous scale of the sewers of different sizes and kinds, the models in this case built of the actual materials used in the actual way, with the railways and working models of the little cars used in them, and of the

boats which float in the largest sewers. The system, now thoroughly carried out in all its details, by which all the sewage of Paris is carried to the Seine at Clichy, far below the city, below even the Bois de Boulogne, so that you can swim in the river anywhere, ride your horses into it, or fish in it with the chance of catching something—this great network of sewers, so accessible and traversable that rumour ascribes to the late emperor the intention of using them as military roads in the case of popular dissatisfaction—all this is made so clear to the student that he can escape the regulation journey through them, if he will. Here are immense plans of the water-supply of Paris, as it was anciently at different epochs, and as it is now, together with large scale drawings of new aqueduct buildings and models of some of the more important. Models of the two or three newest bridges over the Seine are also to be seen; of which bridges the very latest built is the little "Pont de Passy," just below the Exhibition grounds—a foot-bridge made necessary by the taking into the inclosure the Pont de Jéna, but which will remain as an added convenience.

Enormous plans, plans in relief and bird's-eye views of different cemeteries and parks, of the Bois de Boulogne and the Bois de Vincennes, hang under the shelter of the outside verandas. Specimens of every sort of paving and flagging, roadways and sidewalks, with elaborate tables setting forth the results of wear on each one of them; plans of street railways, with models of rails and cars; drawings and models of all the different kinds of kiosk and illuminated pavilion used along the boulevards and wider streets, and, finally, plans, views, statistics, and specimens of the establishments of horticulture and arboriculture—all go to make up such a museum of city life as the round world cannot match elsewhere. And the crowning feature, in popular estimation, is the huge model of "the meeting of two ways, a boulevard and a wide street, with the sidewalks, water-hydrants, and sewer-culverts, the paving, rails of tramway, grass-plots and trees, seats, system of lighting, office of cabs, advertising column (illuminated from within), urinoir, and kiosk of news-vender." This affair shows a piece cut right out of Paris and seen through a diminishing-glass. Here are the houses, split right down through floors and roof, showing how water and gas are laid on and how sewage is carried off; under the street-level yawn the open sewers, and the water and gas mains are there, supported by posts within the sewers or bedded in the soil; there, too, is the ingenious system by which parts of each house can be entered from the sewers through an iron grate used only for that service, and the clever invention which prevents the flooding of cellars in the worst cases of "set-back." The thing is complete, even to the gas-meter of each house, in a handy place for consultation, and the waste-pipe from every bath-tub traceable from bath-room to drain-pipe under ground.

PARLIAMENTARY NOTES.

CIVIL SERVICE ESTIMATES.—Votes to complete the following sums were agreed to last week:—£35,510 for royal palaces; £2,975 for Marlborough House; £113,561 for royal parks and pleasure grounds; £32,930 for the Houses of Parliament; £117,255 for public buildings; £15,885 for furniture of public offices; £181,331 for Revenue Department buildings; £46,750 for County Court buildings; £22,018 for Metropolitan police courts; £8,203 for sheriff court houses, Scotland; £120,300 for the new Courts of Justice; £133,500 for the surveys of the United Kingdom; £20,786 for the Science and Art Department buildings; £4,719 for the British Museum buildings; £47,476 for the Natural History Museum; £20,000 for the Edinburgh University buildings; £17,062 for harbours, &c., under the Board of Trade; £198,356 for rates on Government property (Great Britain and Ireland); £10,000 for Metropolitan fire brigade; £12,110 for lighthouses abroad; and £23,216 for diplomatic and consular buildings. In class 2, the following estimates were also agreed to:—£43,244 for House of Lords offices; £50,311 for House of Commons offices; £59,815 for the Treasury, including Parliament counsel; £89,502 for Home Office and subordinate departments; £77,490 for Foreign Office; £39,217 for Colonial Office; £30,604 for

Privy Council Office and subordinate departments.

TRAMWAYS.—The report of the Committee of the House of Lords appointed "to inquire into the regulations which it may be desirable to impose in relation to the construction and use of tramways," was published on Monday. The following summary exhibits such of the regulations which the committee consider it would be desirable to impose at the present time in relation to the construction of tramways:—1. It is desirable that, wherever it is possible, tramways should be constructed and maintained, but not worked, by the local authority. 2. The preliminary consent of the local authority to the construction of tramways by private promoters should be required as at present, with the exception that where the proposed tramway passes through the districts of more than one local authority, and those authorities differ as to whether it should be sanctioned or not, there should be an appeal to the Board of Trade. 7. No absolute *minimum* width of street or road should be laid down, and the veto conferred, under certain circumstances, by Section 9 of the Tramway Act, 1870, upon one-third of the frontagers should be done away with; but as a general rule, there ought to be at least 9ft. 6in. between the edge of the tramway and the kerb, and a *minimum* width of 24ft. from kerbstone to kerbstone; it should, however, be left to the Board of Trade to decide, according to the special circumstances of each case, what width of roadway is required to provide adequately for the safety of the public and the convenience of ordinary traffic. 8. No preference should be given to one gauge over another, but the width of gauge should be settled freely, according to the circumstances of each case, Section 25 of the Tramways Act, 1870, being altered accordingly. 9. The Board of Trade should instruct their inspectors to pay particular attention, in their inspection of tramways, before they are opened for use, to the solidity of the permanent way; and should also, in the case of existing tramways, satisfy themselves, before sanctioning the use of mechanical power, that the permanent way is constructed in a sufficiently solid manner to bear the increased wear and tear. 10. The Board of Trade should have power to regulate the width of groove to be used in the rails, so as to protect the wheels of carriages or other vehicles, as far as possible, from being caught in the grooves. 11. A tramway company which fails to keep its rails and its own part of the road in good condition and repair, in accordance with the requirements of Section 28 of the Tramways Act, 1870, should be made liable to a penalty not exceeding £5 a day.

COMPETITION.

RAMSOATE.—At a special meeting of the Local Board Commissioners it has been resolved that Mr. James Abernethy, vice-president of the Institution of Civil Engineers, should be engaged to adjudicate on the designs sent in for the proposed new road, and that he be paid a fee of 100 guineas. In reply to a member, the chairman said Mr. Abernethy would simply award the premiums, and then it would come before the ratepayers to select a plan.

A new reredos has just been placed in All Saints' Church, Cokermonth. It is constructed of oak, consisting of three panels, in tracery, with buttresses. The centre panel is finished with a canopy and bold finials, and bearing a Maltese cross, with the monogram I.H.S., on either side of which are passion flowers. On each side of the reredos are two panels, in oak, bearing the Decalogue, Lord's Prayer, and Apostles' Creed, illuminated on metal, the dado being formed of Minton's encaustic and majolica tiles. The oak work was prepared by Mr. John Hunter, of Cokermonth; whilst the Decalogue, &c., was the work of Mr. John Scott, of Carlisle; and the carving is by Mr. R. Little, of Carlisle. The designer of the whole was Mr. W. C. Jennings, architect, of Cokermonth. The cost of the work amounted to about £100.

The tender for the erection of the proposed new schools and cottage homes at Withington, in connection with the workhouse extension scheme, has been accepted by the Guardians; but as the amount is £2,000 above the sum which the Board obtained power to borrow, the work, it is feared, will not be proceeded with as early as was expected. The accepted tender, that of Mr. J. Herd, was selected from 11 others. The highest was £19,180, and the lowest, £15,190. That of Mr. Herd was for £16,924.

Building Intelligence.

ADEL.—The church of St. John the Baptist, Adel, near Leeds, was last week reopened. The edifice is one of the most perfect examples of Norman architecture, and is supposed to have been erected about 1140. In the interior, the chancel arch, usually the point of special attention to Norman builders, is remarkable in a small country church for its height, 15ft., and width of span, 12ft. The building having recently fallen into decay, it was resolved about twelve months ago to close it for repairs. It was also resolved to raise the roof of the edifice, which at some period appears to have been depressed—to its proper pitch. This has now been done. A number of modern windows have been removed, and restored to their ancient type, and the unsightly vestry has been replaced by a detached octagonal one. The gallery which formerly existed at the west end of the church has been removed, along with the narrow pews; the nave and chancel have been seated with oak; and the walls have been cleared of plaster. The chancel has also been laid with encaustic tiles, and new doors have been provided in various parts of the church. A new heating apparatus has also been put down. The cost of the work is estimated at about £1,500. The restoration has been carried out by Mr. G. E. Street, R.A. (diocesan architect).

BATH.—The foundation-stone of the new college at Bath was laid on Tuesday. The architects are Mr. T. Hine, of Plymouth, and Messrs. Wilson, Willcox, and Wilson, of Bath; and the builder is Mr. J. Long, of Newark-street, Bath, whose tender was £6,180. The front elevation of the new building will be in the Classical style, to harmonise with Vellere and its portico. It is proposed to have a colonnade to connect the present and new structures, and it will be so formed as at a future time to constitute the entrance of a chapel or lecture-room built between the two. On the ground floor there are to be six class-rooms about 20ft. square, and secretary's, clerk's, and other offices. On the first floor three similar class-rooms will be provided, and a schoolroom 60ft. by 30ft. The same floor will also contain the masters' apartments.

BELFAST.—The new Presbyterian Secession Church, Botanic Avenue, Belfast, has just been completed. The external walls of the church are executed in Serabo stone with strings of Donaldson stone. The façade of the church is relieved by a slight projection flanked with buttresses; a large four-light window, with pointed head and cusped tracery, filling the upper portion of it. The style is Early Gothic. A commodious manse, in keeping with the church and adjoining it, has been lately erected. The general contractor for the work is Mr. Martin Curry. The architects from whose plans and under whose superintendence the buildings have been erected are Messrs. Young and MacKenzie, Denegall-square East, Belfast.

BELFAST.—A new hospital for sick children has been erected in Queen-street, Belfast. The Queen-street front is of cut stone in the Queen Anne style; the rest of the building has been executed of perforated red bricks. Mr. William McCammond, of Brookvale-terrace, Antrim-road, has been the general contractor. The gates and railing are by Messrs. Musgrave and Co., Limited. The cost of the whole has been upwards of £5,000, and all has been done from the designs and under the superintendence of Messrs. Thomas Jackson and Son, architects, of Belfast. The flues to carry off used-up or impure air are in proximity to the smoke-flues, there being influx of fresh air also by means of Sheringham's patent ventilators. Boyle's patent ventilators have been introduced at highest level of each staircase to ventilate them and the corridors.

CHELTONHAM.—A new church of St. Matthew was consecrated at Cheltenham on Thursday in last week. It is constructed of stone, and seats 1,400 worshippers. The style is Early English, with the smallest possible amount of ornament. It comprises nave and aisles, with vaulted entrance porch at the north-west corner, beneath the tower, upon which a spire has yet to be built, a chancel, aisles, and vestry, galleries in the transepts, and an ambulatory on the south side. The nave is 104ft. in length by 40ft. wide, and is divided into 7 bays, the two easternmost ones narrowing

in the width of the nave to that of the chancel, which has an apsidal termination. The nave columns are circular, and of dark grey stone, with a beading of white stone, at the half of their height, the capitals terminating with a plain ogee. Some of the capitals in the chancel are carved, as well as the gargoyles, and the panel over the porch. All the windows are plain, except the rose light at the west end and the large east window, which are worked in plate tracery. The organ is placed in one of the bays of the chancel. The roof is wainscoted in plain wood, and the seats are open and stained. The pulpit is of stone, with Lizard marble panels, and there are panels of the same marble at the apsidal termination of the chancel. The tower and spire, when completed, will rise to a height of 190ft. The present contract for the building amounts to over £14,000, but the entire scheme would involve a cost of £18,000. Mr. Evan Christian, of London, is the architect, and Mr. A. Estcourt, of Gloucester, is the builder.

HAWICK.—The fountain erected to the memory of the late Dr. John Douglas was placed in the Wellgate Cemetery last week. The style is Gothic. The arch is supported by four pillars, with foliated capitals resting on a base 6ft. square at the bottom. Surmounting the arch is an octagonal spire, terminating in a broad mould and finial of carved fern foliage. The height of the fountain is 20ft. The basin, which is of rock-work, is placed between the pillars. Mr. Lawrence Beveridge, architectural sculptor, Edinburgh, is the contractor.

LINTON.—The parish church of Linton, Cambridgeshire, has been reopened after the restoration of the chancel and Millicent chapel, from the designs of Mr. J. Cory, of Carlisle, architect to Pembroke College, Cambridge, the lay improprators. The original open wooden roof which had been ceiled is now exposed to view, windows on the north and south of the chancel and the priest's door have been reopened, the mullions and stone-work repaired, and a new lead roof placed on the chapel, and the windows filled with tinted glass. An oak reredos, carved by Mr. Godbold, of Harleston, from the architect's drawings, extends the whole length of the east end, with returns north and south, in which the only remaining pieces of the old screen have been worked, and new altar rails and prayer desk of carved oak have also been added. Mr. Whitehead, of Saffron Walden, executed the masonry; and Mr. D. P. Day and Mr. Chappell, both of Linton, the carpenters' work, and the glazing and lead work respectively. A new organ has been erected by Mr. Hunter, of Kennington-road, London.

ROSS.—The foundation stone of a new dispensary and cottage hospital at Ross, Herefordshire, was laid on Tuesday week. In the autumn of last year the committee sought by advertisement for designs for their proposed new buildings. Some eighteen architects sent in plans, and after consideration three out of the number, marked respectively "Well considered," "Light and air," "Thorough," were returned for final decision, when the first named, being the production of Messrs. Haddon Brothers, of Hereford, Malvern, and London, architects, was unanimously adopted. The greater portion of the edifice is but one storey high, and contains on the ground floor, ward for males, as also ward for females, having a capacity of 1,200 cubic feet, for four beds in each, fitted with lavatories. The remaining portion of ground floor is occupied by a nurse's sitting-room, a fire-proof staircase, store rooms, kitchen, scullery, and larder, coals and other out-offices, as well as a mortuary. On the upper storey is a special ward for isolated cases, and nurses and servants' bedrooms, &c. The walls are to be built hollow of brickwork, and the roofs covered with Broseley tiles. The contract sum is £1,200, and the work is being carried out by Messrs. W. and J. Crowe, of the City Saw Mills, Hereford.

STRATFORD-ON-AVON.—The Shakespeare Memorial Theatre at Stratford-on-Avon was opened on Wednesday. The building, of which Messrs. Dodgshun and Unsworth, of 13, Buckingham-street, Strand, are the architects, was illustrated and described by us in the BUILDING NEWS of September 15th and 22nd, 1876. The theatre is small but compact. The length from front north to south is 94 feet; from east to west 79 feet, inclusive of projections for tower and turret. The north end is occupied by the stage. On the mezzanine floor there are seven dressing-

rooms. Under the pit, on the same floor, is a spacious apartment to be used for storage purposes. The stage is on the ground floor, and is 37 feet by 46 feet, at the back of which are the property-room and the green-room. The width of the proscenium is 26 feet, the height 27 feet 6 inches. The pit is 36 feet by 38 feet, horseshoe form, supported by massive brick piers and wrought-iron girders. At the back of the pit there are stairs communicating with the south entrance. The pit has on the outside a corridor, 5ft. wide, having three doorways, exclusive of the principal entrance. The pit corridor and vestibule are laid with tile paving. Adjoining the vestibule is a ladies' cloak-room; solid York-moulded steps, having ornamental iron balusters, English oak handrail and moulded dado framing, lead from the vestibule to the dress circle, which affords accommodation for four tiers of chairs. Above the dress-circle is the gallery, consisting of four rows of raised seats, supported by wrought-iron girders, and extending over the pit to the same line as the dress-circle; running round the back is a corridor similar to that communicating with the pit. On the same level are the flies and artists' room. The roof over the auditorium is supported by wrought-iron principals; that over the stage is of a lighter description, the principals and tie-beams being bolted together with iron rods, shoes, and straps. The roof is of Eureka green slates. There is a circular turret on the east side of the building, the height of which is 64ft., and which affords private communication from the mezzanine floor to the dress-circle, gallery and flies, and also communicates with the stage. In the tower are three rooms. A large iron tank carried on wrought-iron girders affords provision in case of fire. The topmost room of the tower gives an excellent view, being at a height of 82ft. The auditorium is lighted by a sun burner. The building is of red brick, with stone dressings. All the stairs and landings are of hard York stone, and the woodwork generally of Christiania yellow pine. There is a dado framing to the vestibule, orchestra stalls, and gallery. From the line of concrete to the finial of the principal tower the height is 113ft. On the south side of the building from the concrete to the eaves is a distance of 42ft., of which there are 34ft. of brick and stone work surmounted by rustic work set out on stone brackets, forming the corridor to the gallery. The walls average 3ft. in thickness, and those of the tower 3ft. 6in. All the doors open outwards. The style of the Memorial is principally Early Elizabethan, which will harmonise in some measure with Shakespeare's House; and room can be made, if necessary, for a thousand persons.

TINSLEY.—On Saturday the Archbishop of York opened a new church at Tinsley. Mr. George Edmund Street, R.A., is the architect. The church is built of stone in the Flowing Decorated style, and contains chancel, nave, north aisle, organ chamber, and vestry. The chancel is 26ft. long, and 18ft. wide; and the nave 63ft. long, and 24ft. wide. The aisle is 10ft. wide. There are two entrances to the main building, through a porch on the south side and a door on the west. Above the porch there are carved crockets, whilst at some distance away is erected a lychn-gate. The church is roofed with tiles, and at the east end is a turret containing three small bells. The church is dedicated to St. Lawrence, and will accommodate 380 persons. The total cost is about £5,000. Mr. Arthur Hodgson has been clerk of the works.

WEST KNOYLE.—The parish church of West Knoyle, near Mere, Wilts, was reopened after complete restoration on Thursday week. The church has been newly roofed, that in the nave being of open timber work, and that in the chancel of pitch-pine pannelled. The chancel is fitted with carved oak benches, and a new tiled floor. A new reredos and a new pulpit of oak have been added, and also a new font of Bath stone. The porch has been entirely rebuilt, chiefly of the old materials. The tower has been repaired and the bells rehung. An organ-chamber and a vestry have been added to the church. Tisbury stone has been chiefly used in the work of restoration, which has cost £1,800. The architect was Mr. J. M. Allen, of Crewkerne, and the builders, Messrs. Osborne and Son, of Shaftesbury, and Mr. Davis. The wood has been executed by Mr. T. Osborne.

Mr. John Day has been appointed surveyor to the Bedford General Infirmary and Fever Hospital.

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TO CORRESPONDENT.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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BROSELEY. (His address can probably be obtained from the source indicated. We do not know it.)—R. B. HESLOP. (St. Peter's, at Rome, was commenced by Bramante, and continued under the direction of Raffaele, Gisendo, Guiliamo di San Gallo, Peruzzi, Antonio San Gallo, Michael Angelo, Jacopo della Porta, Domenico Fontana, Pirro Ligorio, and Carlo Modona.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED TOO LATE.—"Triangle in Circle." (Piquant, but not good in angle bay.)—"Omega." (A correct and ornate Late Gothic design, with good arrangement of entrance to middle shop.)—"Try Again." (Wasteful, but shows improvement.)—"Be Mindful." (Ditto.)—"Dunwich." (We find your design was noticed under "Norwich" by a misprint.)

Correspondence.

LIGHT AND AIR.

To the Editor of the BUILDING NEWS.

SIR,—I have read with much interest a paper on the above subject in your last week's issue, in which, however, I find it stated repeatedly that a prescriptive right to an easement is obtained by twenty years' enjoyment.

Allow me to ask Mr. Ball if it is not now the case that twelve years' enjoyment confers such a right? The alteration has, I think, been made by an Act passed so recently as last Session.—I am, &c.,

Temple Club, Arundel-street, Strand. T. R. S.

SPECIFYING TIMBER.

SIR,—In the article in your paper of the 11th inst. on "Varieties of Building Timber," you very justly state that the varieties "are not easily distinguished by those who have had little experience in building operations."

My experience leads me to suppose that this difficulty is not confined to novices in the building art; in fact, I much doubt whether any ordinary engineer or architect not specially acquainted with the timber trade can ensure that

he be supplied with any particular brand he may specify; he certainly cannot do so if he has to deal with a shifty contractor without great trouble.

The question has occurred to me whether it is necessary to rely on brands and trade marks at all.

What we require is sound timber, which shall be equal to certain strains, and in some cases be of a given colour, grain, &c. Why not specify the timber, not by its brand, trade mark, or port of shipment, but as of a certain wood, sound, seasoned, free from shakes, sap, &c., &c., and that samples of a certain size shall under certain conditions bear a given strain, transverse or otherwise.

If this was the general custom, the strength required for all ordinary purposes would soon be ascertained by experiment and become generally known; and those superintending building operations would have a satisfactory test that the timber used was suited for the purpose intended.

The present system seems to me very vague and unscientific.—I am, &c.,

HAMILTON TOVEY, Major R.E.
Waltham Abbey, Essex, April 21st.

DANGER OF CREOSOTING TIMBER!!!

SIR,—After making a study of creosoting timber for over 13 years, and collecting a vast amount of information on the subject, both *pro* and *con*., and finally settling down to the belief that, if properly carried out, it is a good and just thing to do, judge of my surprise upon reading on p. 412 of your last number that a witness, in speaking of a fractured post, says "the rotten condition of it was due to its having been creosoted, as the process caused timber to be hermetically sealed, and thus the juice of the wood was not allowed to pass off, and rottenness in the centre was the unavoidable result."

These strictures must really apply to a post which has simply been paid over with a coating of tar on the outside only, regardless of the interior condition of the timber. There is a wide difference between this and creosoting, for, if the witness has studied the subject at all, he ought to know that the juice (sap) and air are extracted before the creosote is injected. As for the assertion, "it had been found by experience that creosoting was a failure," I am more than amazed by it, for our dock and harbour engineers, railway contractors, telegraph engineers, &c., &c., use creosoted timber to a very great extent.

There must evidently be something very wrong either on the part of witness or else on the side of these engineers and contractors, for why do they continue its use if the process has been proved a failure?

If this gentleman, or any of his friends who have formed an adverse opinion to the virtues of creosoted timber, applied to the Secretary, I feel sure he would, in his usually kind and obliging manner, send them a copy of Mr. Brain's paper, read before the Society, and fully criticised by a large meeting of members, which contains a very good description of the process and the very good results attained by the use of CREOSOTED TIMBER.—I am, &c.,

A MEMBER CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

7, Westminster Chambers.

SIR,—For the first time in my experience, I learnt on reading the article on page 412, last number, that creosoting detracted from the strength and durability of timber.

On the 26th ult., Mr. James Siveright, Superintendent of Government Telegraphs at the Cape, read a paper before the Society of Telegraph Engineers, in which he says, "Fir grows around Cape Town, but nothing short of creosoting will make it last."

Now, whom am I to believe—the gentleman who gave evidence as stated in your article, or Mr. James Siveright above mentioned? One or the other must be wrong.—Which is it?

On asking my chief, he says "Creosote your piles with 8lb. (sp. gr. 1,000) per cubic foot, and see that you get it."—I am, &c.,

ASSISTANT ENGINEER.

BUILDING MACHINERY.

SIR,—Under the head of "Building Machinery," in your issue of April 18th, I noticed the following remarks on the subject of "scaffolding":—

"To name another clumsy, blundering plan, rendering our workmen liable to all manner of accidents, just look at our system of scaffolding with fixed poles and cords. How long will this muddling plan prevail, we wonder? Here there are signs of improvement, however, as an excellent invention has been introduced for using square timber Something far better, and by no means difficult to arrange, would be a platform of light ironwork, raised six inches, say, at a time by hydraulic pressure or a simple rack and pinion."

If some particulars of what has been done of late, without the employment of the usual scaffold-pole, or the square timber arrangement referred to by you, will be of interest to your readers, I shall be glad to forward a description and sketches of a scaffold used in the erection of one of my buildings—a Gothic church.

This building, including a tower about 90ft. high, was built with merely one stage of scaffolding, instead of a series of stages, as is ordinarily the practice.

After the foundations had been put in, and as much walling built as could be conveniently accomplished by the workmen whilst standing on the ground, the scaffolding was placed in position—that is, a single stage of scaffolding only—the top of the work then built being about 12 inches above the level of scaffold boards. Two feet six inches of walling was next built from this scaffold platform; then the whole range of scaffolding was screwed up a distance of 2ft. 6in.; another height of walling (2ft. 6in.) was then added, and the scaffolding screwed up another 2ft. 6in., as before; and so on, until the full height of wall had been built as required.

On the tower, where I more particularly timed the work, it was found that the workmen could cease walling, screw up their scaffold the required 2ft. 6in., and be at work on the walls again, in from 12 to 16 minutes—this being accomplished without clearing the scaffold of a single piece of stone, hoisting tackle, or mortar-board, the scaffold, workmen, and materials all travelling up together.

I may state that the work was double scaffolded—that is, it had the scaffolding platforms on both sides of the wall—an arrangement which, I think, would be more generally adopted where the scaffold-poles prevail, were it not that such a duplication of the parts about doubles the cost. In the case I am describing, the cost entailed was represented by the price of the extra scaffold platforms and a few slings—nothing more.

With a view of placing the "wallers" in as good a position as the "shed-men," a portion of the scaffolding was covered in, and the work was carried on in wet weather the same as in dry, the covered scaffold being as easily and as quickly screwed up as the other portions.

This covering in of scaffolds opens up a question for the careful consideration of the builder. If machinery is to pay a fair dividend for the money invested in it, it must be kept running; and if builders are to secure a good return for the money spent upon plant, they should be able to keep that plant at work, instead of letting it lie idle whenever there is a day's rain. The general adoption in towns of such an arrangement as I am here advocating, by facilitating building operations, would be a boon to the public at large, and cause us to hear less of the "hoarding nuisance."—I am, &c.,

JOSEPH J. LISH.

1 and 2, Bucklersbury, Cheapside, E.C.,
April 22nd, 1879.

HOUSES AT MANCHESTER AND NORTHAMPTON.

SIR,—Your *exposé* of architectural piracy last week did not surprise me. I was struck with the transparent coolness of the matter some years ago, but after calling Mr. Godwin's attention to it I thought no more of the affair. I believe Mr. Godwin considered it beneath his notice, or, at any rate, would not "trouble the waters" himself. Still, I think every lover of fair-play in design will endorse your action. I can almost guess the "excuse" that the Manchester architect will offer:—"Purely a coincidence"; "Similarity of mind in the authors"! Surely this sort of thing is worth the serious attention of the Manchester Society of Architects. Let us hope the "unfortunate imitator" will receive proper chastisement from his fellow-members, for clearly he has not too much

modesty, from the fact of his actually building this house to live in. After all, it is evident he preferred Mr. Godwin's ideas to his own.—I am, &c.,
BIRCH ROB.

SIR,—“Murder will out,” even in architectural copyism; but before condemning the lively and spirited architects who have come out in such brilliant colours, one ought, I think, to inquire whether they have any arrangement with Mr. E. W. Godwin to reproduce his design.

Churches by the score bristling with originality have emanated somehow from this enterprising firm; but of all their creations possibly this house is one of their best, still “they all do it.”

Strange to say, I know of an admirer of a chapel of theirs, once taking the liberty of sketching it from the road, when the gentleman who never used other people's ideas approached and saucily ordered him off. Other characteristics might be added; but perhaps the Manchester house is a pill large enough for the present.—I am, &c.
HARRY.

WESLEYAN CHAPEL COMPETITION, SWINDON.

SIR,—I see by the *North Wilts Herald* of last Saturday date that the foundation stone of this chapel was laid on the 16th inst., and a public meeting was afterwards held in the Corn Exchange of that town, when, in the course of some remarks, the chairman stated the buildings would cost £4,891 8s.

Some time ago the committee advertised for plans for this chapel, and one of the conditions stated the buildings were not to cost over £2,000. I ask, is it justice to the other competing architects for a plan to be selected, the cost of carrying out the same being more than £2,000 above the stipulated amount?—I am, &c.,

April 23rd, 1879. A LOVER OF JUSTICE.

CHIPS.

A new Congregational Church was opened at Mount Pleasant, Hastings, on Tuesday. Mr. T. Elworthy was the architect, and Messrs. C. and E. Harman were the contractors.

The Burton-on-Trent Rural Sanitary Authority have under consideration plans, prepared by Mr. Walker, C.E., of Cannock, relating to the sewerage of Barton-under-Needwood. Mr. Walker recommends that an entirely new system of sewerage be laid down, and that the sewerage should be disposed of by irrigation. The cost of the scheme is estimated at £2,700.

The credit allowed in the timber trade on the Clyde has been shortened since the commencement of the present month from six months, or a discount of 3 per cent. for cash, to four months' credit, or a discount of 2½ per cent. for cash.

Works of sewerage are being carried out at Catthorpe and Holymoorside, Derbyshire, from the plans of Mr. Gould, surveyor to the Brampton Sanitary Authority.

It is proposed to raise £1,000 in shares in the town of Romford for the purpose of altering the old Congregational Chapel in North-street, in that town, so as to fit it for use as a literary and mechanics' institute.

The county magistrates of Essex have approved plans prepared by the county surveyor (Mr. Stock) for the erection of a new recreation room and dining-rooms at Breatwood Pauper Lunatic Asylum, at an estimated cost of £4,500.

The town commissioners of Surbiton-on-Thames have accepted the tender of Messrs. Turner, of Liverpool, to do 5,000 yards of asphalt at 1s. 9d. per yard.

A provisional order has been granted by the Board of Trade to the North London Suburban Tramways Company, who are the promoters of a new line of tramways, of about ten miles in length, from Stamford Hill to Cheshunt, via Tottenham and Edmonton. An exceptional clause in the order is that the Edmonton Local Board have secured powers requiring the promoters to use in that parish such materials and mode of construction for surface and foundation of road as they shall judge best. The Middlesex county magistrates will also compel the promoters to maintain the whole of the bridges and 100 yards of the approaches on either side which may be crossed by the line.

The *Temps* announces that the boring of an artesian well for the purpose of investigating the nature of the chalk layers through which the submarine tunnel between France and England is to pass, was resumed on the French coast at Sangatte on the 1st of March last.

Intercommunication.

QUESTIONS.

[5745].—**Wood Roofs.**—Will any reader kindly inform me the following:—After having ascertained the strains on the various parts of a roof truss, how am I to get the scantlings of the various parts in a wooden roof to bear the strains? I should like a reliable formula.—NIL DESPERANUM.

[5746].—**Plastic Slate.**—I have several times lately come across the term “plastic slate roofing” in American specifications. Is this “plastic slate” some new Transatlantic building material or only a Yankee name for roofing felt?—KAPPA.

[5747].—**Geological Tour in Wales.**—I am desirous of taking two weeks' tour through North Wales for the sake of information on geology. Will some one tell me the best route to take so that I may see the most natural sections?—W. F. W.

[5748].—**Museum Plans.**—Is there any work showing plans, &c., of British, South Kensington, or Peel Park, Salford, Museums, or any book giving assistance in designing such structures?—R. A. P.

[5749].—**Quantities.**—I have a short time ago prepared plans, sections, and quantities. On the day for the tenders being sent in my employer said he objected to me receiving the usual 2½ per cent., therefore none of the tenders were accepted. A few days later the employer himself wrote copies of the quantities furnished by me, and sent them to various contractors to obtain tenders which in many cases failed so to do. He has objected to pay me anything more than for the plans. I likewise gave him a copy of the quantities, &c., before they were sent out, of which he approved. What shall I do?—A. B. O.

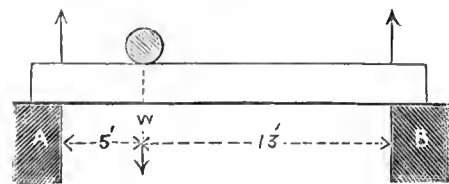
[5750].—**Litigation.**—Will some one kindly tell me—1st, whether there are some or many instances when architect appears in court against his client and in favour of the builder as to extras, and, if so, please cite some of them! The particulars of my case are as follows:—I was commissioned by a public Board to prepare plans and specifications for certain buildings, and to superintend over the erection. The contract was £500. At the completion I made an appointment and met the builder and two gentlemen of the Board to inspect the building. I found everything done to my satisfaction. But as there were some deviation from plans made according to the wish of the Board, I made a statement of the same, naming in detail on one side “as per plan,” and on the other “as built.” The balance was in favour of the builder of something under £5. I gave the builder a certificate of completion, but the Board refused to pay the balance. 2nd. Is my reputation not at stake if I do not go to court (at the request of the builder) in favour of justice, and prove that I am right in my statement?—A YOUNG ARCHITECT.

REPLIES.

[5726].—**Rolled Joists.**—ERRATA.—In last week's reply for $W = \frac{cad}{L^2}$ read $W = \frac{cad}{L}$. L is the breaking weight in tons on the centre.—H. A.

[5728].—**Coloured Building Stone.**—Like your correspondent “G. H. G.,” I do not know any stone by the name of Findon. Possibly “W. W.” means Finsdale, which is brought by water to London and is a light grey ferruginous sandstone of a warm tint. Speaking of coloured stones, your correspondent “G. H. G.” I think rather overdoes the matter, as I assume that “W. W.” wishes to have variegated colours for decorative purposes. It would be better to class them as red, blue, white, and grey. Commencing with the red (brick red) the best in colour are Corshill, Mansfield, Dornfries, Dumbarton, Carlisle, Woolton, Runcorn, Ardrossan, Upper Arley, and Newbiggin, some of which are hard, fine, close-grained sandstone, others soft and friable. Blue stones: Blue stones range in colour from a fine dark blue to a soft or French grey. The following are a few of their names:—viz., Pennant, Dean Forest, Cunliffe, Haadsworth, Thorpe Lane, Greenmoor, Robinhood, Knottingley, and Maninghen. White stones: Craigleith, Dalmeny, West Pines, Coxbench, Ambersley, and Hollington. Grey stones (warm grey): Wild Carr, Spinkwell, Scothall, Finsdale, and many others. The whole of the foregoing are fine-grained sandstones. The colours of the Oolitic limestones are too well known to need repetition. There are many variegated marbles and granites, but these are not generally enumerated under the head of coloured stones. If your correspondent will communicate with me I will show him numerous specimens of coloured stones.—SAMUEL THICKETT.

[5737].—**Load on Beam.**—The relation between the forces of weight and support is determined by the proportion between the segments. If a beam be supported at both ends and loaded as in the figure, the pressures on the



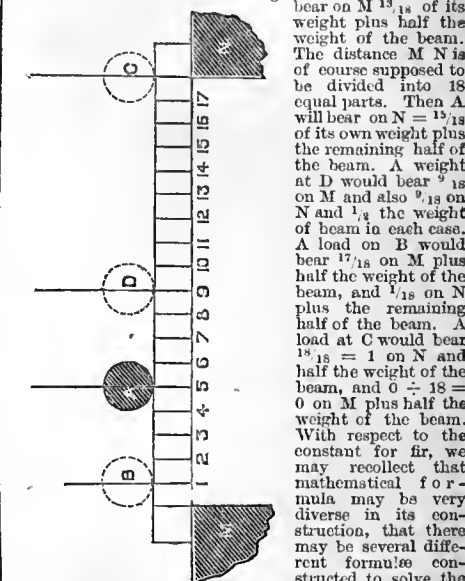
supports are as the segments. Thus if the two segments of the beam are called m and n , the pressure on the left support equals weight $\times \frac{n}{m}$ and that on the right weight $\times \frac{m}{n}$. In a beam the breaking weight is inversely proportional therefore to the product of the segments.—G. H. G.

[5737].—**Load on Beam.**—Let the beam A B be

regarded as a lever, on which the force is applied at the point W, the fulcrum being at A, then by the principle of the lever, the proportion of the load or reaction on B $\times 18$ = the total load $\times 5$, therefore the proportion of the load on B = $\frac{W \times 5}{18}$, and the proportion on A is, of course,

the difference between that on B and the total load. The constant S, for fir or other materials is given in tables or can be found by experiment. Given the breaking weight = W, the length = l, the breadth = b, and the depth = d of a piece of fir. Then S can be found from the formula $Wl = S b d^2$. The weight must be suspended from the centre of the specimen.—J. L.

[5737].—**Load on Beam.**—The pressure of the load will be inversely as its distances from supports. An enunciation of the principles involved belong to a lever of the first order, where the fulcrum is between the weight and the power. In our case the fulcrum will be represented by the load. Let us take the case where the distances are 5 and 13, then the weight A as per sketch will bear on M $\frac{13}{18}$ of its weight plus half the weight of the beam. The distance M N is of course supposed to be divided into 18 equal parts. Then A will bear on N = $\frac{13}{18}$ of its own weight plus the remaining half of the beam. A weight at D would bear $\frac{9}{18}$ on M and also $\frac{9}{18}$ on N and $\frac{1}{2}$ the weight of beam in each case. A load on B would bear $\frac{17}{18}$ on M plus half the weight of the beam, and $\frac{1}{18}$ on N plus the remaining half of the beam. A load at C would bear $\frac{18}{18}$ = 1 on N and half the weight of the beam, and $0 \div 18 = 0$ on M plus half the weight of the beam. With respect to the constant for fir, we may recollect that mathematical formula may be very diverse in its construction, that there may be several different formulae constructed to solve the



same problem, and that a letter, a symbol or constant fitting one formula might and probably should be considered as inapplicable to any other unless proved otherwise.—H. AMAROSE.

[5742].—**Drainage.**—An owner or occupier can only be compelled to drain his house into any sewer which the local authority are entitled to use, and which is not more than 100ft. from the site of such house (see Public Health Act, 1875, sec. 23).—WEST DERBY.

STAINED GLASS.

CAMBRIDGE.—The Society of King's College have just completed two important additions to their collegiate buildings. The great west window of the chapel, which has hitherto remained plain and uncoloured, unless a very doubtful tradition is to be believed, has been filled with stained glass in the style of the other windows. The composition, which is one of the largest ever executed in England, represents “The Last Judgment,” and will fairly bear comparison with the rest of the stained glass, which dates from the reign of Henry VIII. The window is the gift of Mr. Francis Edmund Stacey, M.A., formerly a Fellow of the College, and has been executed by Messrs. Clayton and Bell, who have been engaged upon the work for nearly two years. Besides this window, a fountain with the statue of the founder has been erected in the centre of the great court. King Henry VI., clad in Royal robes with crown and sceptre, holds in his hand the charter of the College. He stands on a pedestal of considerable height, and below him on each side are sitting figures of Religion and Philosophy. The water issues from the mouths of two dolphins ridden by *amorini*, and falls first into a basin fringed with dolphins, and finally into a third basin on the level of the turf. The money to provide the fountain and statue was given to the College some fifty years ago by Mr. Davidson, one of the Fellows, and has since been allowed to accumulate. The work has been executed by Mr. Armistead, R.A., the well-known sculptor of the bas-reliefs of the Albert Memorial.

The west window of Willingale Church has recently been filled with stained glass. The window is of three lights with tracery over, and in the perpendicular style of architecture. In the centre light is painted the subject of the Resurrection, and the side lights are respectively filled with the Raising of Jairus's Daughter and the Raising of Lazarus. The tracery is filled with angels, while beneath the side lights are kneeling angels facing towards a memorial catafalque, which occupies the lower portion of the central light. The design was made by the Rev. Ernest Geldart. The work was carried out by Messrs. Saunders and Co., of 75, Endell-street, London.

STATUES, MEMORIALS, &c.

CITY-ROAD WESLEYAN CHAPEL.—A new departure in the fashion of memorials to Methodist worthies is marked in the memento of the late Rev. Samuel Dousland Waddy, D.D., just placed in the old chapel in the City-road by his son, the well-known J.C. and M.P. The pillars which supported the gallery, and the pilasters on either side of the communion recess were mere stucco shams. These Mr. Waddy has had removed, and replaced by massive granite and marble masonry. The shafts of the pillars, weighing about one and a half tons each, are of polished Aberdeen red granite, in monoliths. The capitals are of statuary white marble, carved in the Corinthian order. The pedestals are in polished red Devonshire marble, the moulded caps and bases being of black Devonshire marble. The recesses for the pillars are lined with polished marble. A memorial inscription is incised in gilded letters on the left-hand pedestal. The statuary work has been executed by Mr. John Palsford, of Barnstaple, and the builder's work by Mr. Jessie Chessum, of Shoreditch, from the designs and under the superintendence of Mr. D. Alexander Lander, architect, of London and Barnstaple. The cost of the alterations has been about £700.

CHIPS.

At a meeting held at Eastbourne on Saturday it was resolved to endeavour to raise £4,000 in subscriptions for a cottage hospital, "as a memorial of the late Princess Alice."

Another stage has been reached in the artisans' dwellings scheme at Dublin, the award of Mr. Posnett upon the claims for compensation in respect of the unhealthy area in the Liberties to be cleared for this purpose, having been lodged. The gross sum awarded is greatly in excess of the estimate of the committee of the Dublin corporation and its officials.

At the Easter vestry held at Charlecombe last week a vote of thanks was passed to Mr. J. B. Wilson, of Bath, for his gratuitous services as architect during the improvement and restoration of the church, now almost completed. At the same meeting a new font cover was promised to be added to the church furniture.

The commemoration stone of the parish church of St. George, Gloucestershire, was laid on Wednesday week by the Mayor of Bristol. The fine old parish church, which was completely restored in 1876, was destroyed by fire at Christmas last. It is now being rebuilt from the plans of Mr. P. E. Massey, architect, of London. The estimated cost is £6,000.

Mr. Eli Johnson, a pupil of Mr. Boehm, is engaged on a bust of Dr. Moffat.

The Local Government Board inquiry on the Newmarket sewerage scheme, for which the local board of that town seek to borrow £5,000, was concluded by Mr. S. J. Smith, C.E., inspector, on Saturday, when Mr. J. F. Clark, the engineer of the scheme, explained his plans and the proposed utilisation of the sewage on the land.

According to a daily contemporary, Exeter Hall is likely ere long to exist only in the memory of attendants at May meetings and frequenters of monster concerts and great political gatherings. Negotiations have been in progress for the acquisition of the site for a great theatre, and these have been chiefly impeded by the onerous condition of rebuilding the adjacent houses, a large new hotel being part of the scheme. The hall was built from the designs of Mr. Dering about fifty years ago. It would be missed, for London is but ill-provided with convenient places for great gatherings. It is not, however, the most scientifically constructed of London buildings, and its facilities for allowing the rapid egress of a crowded audience in case of a panic would hardly be approved of in these days by the surveyor of the Lord Chamberlain's office if a theatrical licence were applied for.

An Elizabethan door in a cottage near Hoo, at Minister-in-Thunet, which has been illustrated in Vol. XII. of the Kent Archaeological Society's *Journal*, has been sent to Bifrons by order of the Marquis of Conyngham, the cottage having been pulled down.

The Town Council of Derby held a special meeting on Monday, at which it was decided to carry out a scheme under the Artisans' Dwellings Improvement Act, 1875, in three parts. By this plan it is proposed to remove blocks of dilapidated houses in the neighbourhood of Willow-row, Goodwin-street, and Wright-street, and to replace them by new and habitable structures. The total cost of the undertaking is estimated at £86,000, at twenty years' purchase of the properties.

The construction of drainage works was commenced in the town of Briton Ferry on Monday. Messrs. Hill Brothers, of West-town, near Bristol, are the contractors.

Our Office Table.

The following information in regard to the great value of the ailanthus as timber, is taken from a paper on the subject by Prof. C. S. Sargent:—In experiments made in the French dockyard at Toulon, where the wood of this tree was tested as to its tenacity, or ability to resist a strain, in comparison with the timber of European elm and oak, an average of seven trials showed that the ailanthus broke with a weight of 72,186 pounds, while the elm in a similar number of trials yielded to 54,707 pounds, and the oak, in the average of ten specimens, broke under a weight of 43,434 pounds. Evidence as to the value of ailanthus timber in exposed situations and as to its durability when set in the ground is yet meagre, but the little that we have is favourable. Of its value for interior work and for cabinetmaking there can be no doubt, the wood possessing properties remarkable in so rapid-growing a tree. The wood is at first of a pale straw-colour, but grows somewhat darker with age, and takes a high polish. When cut to show the silver grain it presents a satiny lustre, and as regards freedom from warping and shrinking it is superior to walnut and fully equal to mahogany. It is said to cut up economically, seasons readily, is easily worked, is free from unpleasant odour, and has no ill effects on the tools. For the treads of stairs, the floors of offices, mills, and other buildings, where constant use requires a hard, strong wood, it is probably superior to any of the woods commonly employed in such situations. There is one use for which its freedom from tendency to shrink will especially commend it—i.e., interior finishings. Its warm colour will make it very effective, when used with both lighter and darker woods.

An important link is about to be added to the Midland and Northern railway system by the opening of the line just completed between Swinton and Ferrybridge. The line which will be formally opened for passenger traffic on the 2nd of June will run from the North-Eastern line at Ferrybridge, near to Knottingly Station, joining the Midland system about one mile from Swinton, on the main line north and south, and by the opening of this connection a clear saving of some thirteen miles will be effected in the journey from York to London, as the passenger will travel this way instead of *via* Normanston, Sheffield, and all the towns in the Midland counties too will also be placed in easy communication with York, Newcastle, and the Scotch trains by means of the joint lines. The contract for the making of the line was let in the autumn of 1875 to Messrs. Dransfield and Co., of Liverpool, the first sod having been cut on the 8th of September of that year. The consulting engineer was Mr. T. Harrison, C.E., London, the resident engineer being Mr. Francis Liddell, under whose superintendence the works have been carried out. The total of Messrs. Dransfield's contract will be about £450,000. The line is a little over fifteen miles in length.

INQUIRIES are made from time to time for the best methods of rendering pencil drawings ineffaceable. The *Papier Zeitung* recommends that the paper be prepared in the following manner:—Slightly warm a sheet of ordinary drawing-paper, then place it carefully on the surface of a solution of white resin in alcohol, leaving it there long enough to become thoroughly moistened. Afterwards dry it in a current of warm air. Paper prepared in this way has a very smooth surface. In order to fix the drawing, the paper is to be simply warmed for a few moments. This process may prove useful for the preservation of plans or designs, when the want of time will not allow of the draughtsman reproducing them in ink. A simpler method than the above, however, is to brush over the back of the paper containing the charcoal or pencil sketch with a weak solution of white shellac in alcohol.

PROFESSOR DOREMUS, of the Buffalo Medical College (New York), recently performed an interesting and instructive experiment before his class. A block of sandstone such as is usually employed for window caps and sills, and about twelve inches square and four or five inches thick, had a panel one half an inch deep sunk in each side. In each panel was fitted a block, which was perforated by a piece of common gas-pipe, and this was cemented about the edges. The whole was then coated with an impervious varnish.

Air now entering the pipe on either side had access to the clean surface of the stone beneath the panel, and it was found that if the mouth be applied to the protruding pipe on one side, and a candle be placed in front of the opposite one, it could very readily be blown out by the air, which, with very little effort, was forced through the stone. When a rubber tube was connected with the house gas-pipe on one side of the stone, and a burner was attached on the opposite side, the simple pressure from the gas mains was sufficient to force the gas through the stone till it was lighted at the burner on the opposite side. When by any means the pressure was increased, a very large flame was thus produced. This shows the permeability of building stone. Brick walls and the plastering of rooms are much more porous, and it may be readily seen that unglazed tile, or stone, or brick sewers afford but little security against the escape of sewer gas.

MR. EDWARD CHALLINOR, the oldest earthenware manufacturer of the Staffordshire Potteries, died on the 16th inst., in his eighty-seventh year. Born at Leek, and a son of Mr. William Challinor, a solicitor of the town, he went at an early age as an apprentice to the manufactory of the late Mr. Riley, of Burslem. After his apprenticeship he commenced business himself in 1819 at the earthenware works formerly belonging to Mr. Wood, at the Overhouse, Burslem. These works he subsequently purchased, and in 1839 erected on the site the present manufactory, where Mr. Ralph Hammersley carries on business. Subsequently, having dissolved partnership with Mr. Wood about the year 1841, he built a new earthenware manufactory at Tunstall, being the one now occupied by Mr. Enoch Wedgwood. Here he carried on business until about the year 1863, when he retired temporarily from trade. In less than a year, however, he commenced again at the small works in Tunstall, now occupied by Mr. Ralph Hammersley, where he continued as a manufacturer until about 1873, when, being upwards of eighty years of age he finally retired from business.

At the last meeting of the board of the National Gallery of Ireland a letter was read from Sir Richard Wallace, Bart., M.P., who has lately become a member of the board, offering an interesting picture by Salvator (a portrait of Guercino, the painter), for presentation to the gallery. The director of the gallery, Mr. Doyle, was requested to accept the gift with thanks. Among the principal donations of works of art received for and placed in the gallery during the past year are, a marble statue of Apollo, by F. M. Poncet, a French sculptor of the last century, formerly the chief ornament of the ball-room of Leinster House, from the Duke of Leinster; a "Seapiepe," by Abraham Storck, next to the younger Van de Velde, perhaps the best marine painter of the Dutch school, from the Earl of Portarlington; "St. Cecilia with the Angels," one of the works of Carlo Cignani; "Lucretia," by Elizabeth Serrani, and a portrait of the time of Charles II., said to represent the Duchess of Portsmouth, by Nicholas Maas, all three from Sir Henry Barron, Bart.; and a large portrait group of the Ely family, by Angelica Kauffman, from the Marquis of Ely.

THE new collection of oil and water-colour paintings exhibited in the picture gallery at the Crystal Palace is, on the whole, a better one than that of 1878. The foreign exhibitors still, however, contribute a majority of the more noteworthy pieces. The hanging of the pictures has been accomplished under the direction of Mr. C. Wass. On Wednesday Mr. W. B. Frith, R.A., Mr. J. C. Horsley, R.A., and Mr. G. H. Boughton, acting as judges, awarded the medals offered to exhibitors by the Crystal Palace company. The awards included six gold medals, valued at 25 guineas each, twenty silver medals, valued at 6 guineas, and fifteen bronze medals, valued at 3 guineas. In the competition the works of English artists were divided into three classes:—A, History or figure subjects in oil; B, Landscapes, sea-pieces, animals, and other subjects; C, water-colour drawing, irrespective of subject. In class A, Mr. E. R. Taylor gained the gold medal for "The Cloister Well," the silver medals going to Mr. A. Stocks, Mr. J. C. Waite, Mr. J. Hayllar, and Mr. E. G. Girardot, and the bronze medals to Miss E. Conolly, "Covenanters on their way to Prison," Mr. Haynes King, and Mr. J. Morgan. In Class B, the gold medal was awarded to Mr. A. L. Vernon for a country

idyll, the silver medals to Mr. D. Cameron, Mr. Y. King, Mr. H. Caffieri, and Mr. F. W. Meyer; and the bronze medals to Mr. R. Gallon, Mr. J. Peel, and Mr. L. C. Nightingale. In Class C, Mr. W. Hall's "Ullswater Lake—Moonlight" brought him the gold medal, the silver medals being gained by Mr. Henry Moore, Mr. D. Law, Mr. Hughson Hawley, and Mr. L. L. Pocock; and the bronze by Mr. T. C. Dibdin, Mr. R. Rasell, and Mr. E. Hargitt. The special gold medal open to the competition of artists and collectors for the best picture exhibited, without regard to school, style, or subject, was gained by Mr. T. Davidson, for his "Dowsabell." The works of foreign artists were also considered in two classes. In class D—for History or Figure Subjects in Oil—the gold medal was given to Mr. B. Nordenburg for the "Marriage in a Swedish Village Church;" the silver medals went to Mr. Charles Frere for his group of wheelwrights "Firing the Wheel;" Mr. H. Sondernmann, Mr. L. Vollmar, and Mr. C. Kronberger, and the bronze to Mr. T. Cederstrom, Mr. J. A. Neuhuys and Mr. G. Meyer. The gold medal in Class E—landscapes, sea pieces, animals, &c., was adjudged to Mr. C. Kroner; the silver medals were awarded to Messrs. J. Bauck, V. St. Lesche, H. Baisch, and E. Weichberger, and the bronze to Messrs. O. Jernberg, H. Dieters, and F. Heimerdinger.

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CHIPS.

A new Baptist chapel was opened last week at Westbourne, near Bournemouth. It is Gothic in style, and measures 40ft. by 20ft.; it is built of brick, with stone corbels, and a roof of open timber, varnished. Attached is a schoolroom 20ft. by 15ft. The architects were Messrs. Burton and Stephens, and the builder was Mr. M. Carpenter, all of Bournemouth. The cost has been about £850.

At the last Commencement of Washington and Lee University of Virginia, the diploma of LL.D. was *honoris causa* conferred on Mr. Beresford-Hope, M.P. This diploma was, on Tuesday, presented to Mr. Beresford-Hope at his residence, Connaught-place, Hyde-park, by a deputation from the Rector, President, Faculty, and Trustees of the University.

The Committee appointed to carry out the extension of the Burial Ground attached to the parish church of Southwick have accepted, out of several competitors, the tender of Mr. Charles Curd, builder, of New Shoreham, for building the enclosure boundary walls, &c., for the new ground, and the work has commenced and is being carried out from the plans of Mr. Arthur Loader, architect and surveyor, of Brighton and Shoreham.

The office hours for all clerks in the Queensland public service have been extended from four o'clock to six o'clock in the afternoon.

At a meeting of the creditors of William Wainwright Williams, brick manufacturer, of Bordesley-green, Birmingham, held on Monday, the debts were shown to be £4,236, and the assets £105. A composition of 1s. in the pound was accepted.

A stained-glass window has been placed in the east-end of the south aisle of the chancel of St. Giles's Church, Reading, by the present Mayor of the town, in commemoration of his silver wedding.

The Brougham centenary festival at Cannes was closed by the unveiling of a marble statue, which occupies a site facing the sea, and near the Town Hall.

The memorial to Bishop Heber in the church of Malpas, in which parish he was born, will probably take the form of a stained-glass window.

Mr. George Baker, of Great Yarmouth, has been presented with an electro-plated tea and coffee service, in recognition of his honorary services as architect for the new Primitive Methodist Chapel at Halvergate, Norfolk.

Last Friday a new Masonic Hall, which has just been erected at Ipswich, was opened. The new buildings are built of red brick from the designs of Mr. H. Luff, and have been erected in about four months by Messrs. E. and C. E. Gibbons.

A new Board School in Stinchley-street, Birmingham, was opened on Saturday. The school has been erected by Mr. Walter Brooks, Sheepcote-street, Birmingham, from the design of Mr. W. Hale, architect, Colmore Row, Birmingham. It is built of ordinary brick, in a simple Gothic style, the woodwork being of stained deal. The total amount of the contract was £1,893.

The Monument on Fish-street Hill, London, is at present undergoing several repairs. Among other things, the top of the monument, which was designed to represent a flame, is to be regilded. The work is being done by direction of the Corporation, and it is stated the cost will exceed £500.

Some school trustees confuse the duties of architect and teacher, if an American paper is to be trusted. One recently visiting a school remarked: "Well, Mr. Syntax, you have a very fair school here." Mr. S. "Yes, sir, the school's well enough, but the curriculum is defective." New Trustee. "What, the curriculum defective? We must see the architect at once about it, and have it raised a few feet higher."

Six tenders have been received for the restoration of the nave and muniment room of Bangor Cathedral, but all being much above the estimate, the plans of the late Sir Gilbert Scott will, it is said, probably be modified.

On Easter Monday afternoon the memorial stone of a new Wesleyan chapel at Haxby was laid. The new building will provide sitting accommodation for about 300 worshippers, and Sunday school room for 100 children. The total cost will be about £1,200. The architect is Mr. E. Taylor, of Stonegate.

On Easter Sunday a new Wesleyan chapel at Cottingham was opened. Mr. C. H. Payne, of Kettering, was the architect. The style is Classic. The principal elevations of the building are faced with Harborough pressed brick. The contract was taken by Mr. Crisp, of Harborough, at £423.

The present restoration of the Priory Church, Bridlington, having been brought to a conclusion, the event was celebrated on Thursday week. The Archbishop of York, who preached, said that a former restoration had cost £10,000, the present one £17,000. The restorations are from the designs of the late Sir Gilbert Scott, who took a special interest in the work, which has been continued since his death by his sons, Messrs. G. G. and J. O. Scott. Mr. J. Thompson, of Peterborough, has been the sole contractor, and has executed the work under the superintendence of Mr. J. Wills, the clerk of the works.

A new Cottage Hospital is being built at Maidenhead by Mr. W. Woodbridge, from the designs (gratuitously supplied) of Messrs. Henry Cooper and Son, architects, 86, High-street, Maidenhead. The materials used are red and grey bricks, with Bath stone lintels and sills; the roof to be covered with Broseley tiles. The buildings are intended to accommodate four male and four female patients, and are all on the ground floor. The contract is £1,350.

The foundation stone of a new Oddfellows' Hall, at Launceston, was laid on Easter Monday. The building will comprise a hall, 45ft. by 25ft., lobby, lavatory, ante-room, &c., with rooms underneath for a curator to reside in. The style is to be Romanesque. The steps and plinth will be of granite, and the walls of the best red bricks, with Portland stone dressings. The plans were prepared by Mr. C. P. Wise, architect, of Launceston, and the building is to be erected by Mr. Wm. Burt, contractor, of the same town.

We are glad to hear of the recovery of Mr. C. J. Phipps, who was seized with a sharp attack of congestion of the lungs recently, while in Aberdeen.

Plans have been prepared by Mr. F. Chancellor, of London and Chelmsford, for the restoration of the parish church of Writtle, Essex. The estimated cost is £1,100.

A new bridge erected over the Sutton-drain, at St. Mark's-street, Hull, was opened on Wednesday week. It has been tested to 50 tons, and supersedes a narrow brick arch, built by the late George Liddell. The platform is supported on nine wrought-iron plate girders, each 3ft. apart, and from 1ft. 7in. to 2ft. deep, and on two outside bit girders of like depth under the parapets. The former are covered with buckled plates, and the latter support curved plates, which extend from plate girders, and carry the footways. A layer of concrete is spread over these plates, on which is laid the flagging and wood pavement. The parapets are formed of cast-iron latticed panels, fixed between newels, and terminated by Bramley Fall stone pedestals built on the abutments, which are of white brick. The estimated cost of the bridge was £2,500, and it has been completed for £2,593. It is the fourth bridge constructed during the past five years from the designs of Mr. J. Fox Sharp, the borough engineer. Mr. Malono was the contractor.

The annual meeting of the Association of Sanitary Inspectors of Essex and neighbouring counties was held at Chelmsford, on Thursday, the 17th inst., Mr. A. F. Ginn, of Chelmsford, in the chair. Discussions took place on a paper read by Mr. Bell, of Epping, relating to hospital accommodation for infectious diseases, and on the Public Health Amendment (Water) Act, introduced by Mr. Boulter, of Halstead. Mr. F. Godfrey, of Braintree, was appointed president for the ensuing year, and Mr. Hamilton, secretary.

Steps are being taken to complete the restoration of the parish church of Burnham, Somerset. The work proposed includes the repewing and repairing of the north aisle, and the removal of the present unsightly gallery.

The parish church of Ulceby is to be re-opened on the 29th inst., after the restoration of the south aisle, and the erection of a south porch.

A new reredos has been placed in the parish church of St. Mary, Chelmsford, in memory of the late Archdeacon Mildmay. It consists of an oak frame carved in the Perpendicular style. In this are three panels, each occupied by an oil painting executed by Miss Mildmay, from Italian works; that in the centre represents the Crucifixion. A parclose of carved oak, also in the Perpendicular style, has been placed on the north side of the chancel, and a similar screen is to be placed on the south side.

The first exhibition of the Woodford Industrial and Art Society was held on Tuesday and Wednesday in last week, and proved so successful that it is proposed to make it an annual institution. The exhibition, which originated with Mr. S. J. Taylor, was divided into three sections: 1st. Works of art, containing 29 classes; 2nd. Industrial work by women, containing 21 classes; and 3rd., works of children, containing 15 classes. Besides these a good loan collection was contributed by friends.

A Local Government Board inquiry was held at Southend-on-Sea, on the 17th inst., before Mr. Harrison, C.E., respecting an application from the local board, for permission to borrow £1,000 for new works of sewerage in Porter's Town, Milton-street. The plans have been prepared by Mr. R. B. Harrington, the surveyor to the board. It was stated that the board had already borrowed £12,400, and that further sums of £1,100 for the Hamlet Valley sewerage, and of £1,000 for the eastern esplanade scheme would shortly be required.

Mr. John James has been appointed bridge surveyor for the town and county of Haverfordwest, South Wales.

In celebration of the completion of a new wing to the hospital, at Mereton-in-the-Marsh, the workmen were entertained at supper on Monday week. Mr. Calloway is the architect, and Mr. Gill, the contractor.

The foundation stone of a new Wesleyan church was laid in Bath-road, Swindon, on Wednesday week. The chapel is being erected by Mr. T. Barrett, who has taken the contract at £4,891 ss. 6d.

At Beccles, Suffolk, on Monday, the 14th inst., the foundation stone of a new Congregational Sunday School buildings was laid. The architect is Mr. Edward Bondman, of Norwich, and the scheme includes a principal building seating 300 adults, and 8 class-rooms.

The Town Council of Colchester unanimously decided at a meeting held on Saturday week, to purchase the waterworks from the private company in which they are now vested.

The Wesleyan chapel, at Belper Pottery, has been reseated and refloored; the contract has been executed by Messrs. Wheeldon Brothers, of Belper. A new schoolroom, 48ft. by 21ft., with class-room beneath, has been erected for the same Wesleyan community, by Mr. Loomes, contractor of Belper, and both chapel and schoolroom were opened for services on Easter Sunday.

The Duke of Westminster and Sir Robert Cunliffe visited the sewage farm of Col. Jones, V.C., at Hafodywern, near Wrexham, last week, in order to see in operation the sewerage ejector, invented by Mr. Shone.

A cocoa-house was opened last week, at Rhoslanerchrnog. The alterations have been carried out by Messrs. Jenkins and Jones, builders, of Johnstone, Raibon, and the decorations by Mr. Coplestown, of Wrexham.

The foundation stone of a new Congregational church was laid at Sawston, near Cambridge, on Easter Monday. The church will be Gothic in style, will measure 74ft. by 37ft., and is estimated to cost about £1,500. The architect is Mr. J. Sulman, of London, and the builder Mr. Garwood, of Haverhill.

A new Roman Catholic church, dedicated to St. Patrick, is about to be built at Walton-le-Dale, from designs by Mr. Pugin.

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 2, 1879.

ARCHITECTURE AT THE ROYAL ACADEMY.

FIRST NOTICE.

TO-DAY the private view at the Royal Academy is being held, and deference to the general rule precludes our noticing the works in detail, even if we had time this week to write at length about them. It may, however, be interesting to say a few words generally about the Exhibition, and certainly, at the outset it cannot fail to be observed how very few architectural drawings are this year exhibited. Out of the fifteen hundred and eighty-six exhibits at the Royal Academy only one hundred and fifteen have been selected to represent architecture, a selection hardly equal to two-thirds of the number generally allotted to what Mr. Street called, the other evening, at the Institute Dinner, the "Mother of the Fine Arts." Surely the secondary Arts have ousted their mother, judging from the small collection of drawings permitted this year to represent the "parent art of architecture." And especially is this the case when the comparatively large number of decorative, competition and ideal designs are taken into consideration; for these are this year unusually numerous. The merit of the works shown is, no doubt, as a whole, of an average order, though several representative names are absent from the Exhibition altogether. It seems from the experience of the past that architecture must inevitably take a very second-rate place at the Royal Academy, and, indeed, in the annual exhibition at Burlington House; from the nature of the case probably this must always be so, but we see no reason why the few drawings of architectural works which are exhibited should not illustrate as far as possible the best and most important examples executed during the year. It is true that the past year has by no means been a prosperous one for architects, and their buildings have perhaps been few, but, on the other hand, the rejected drawings from the Royal Academy Exhibition have been very much more numerous on this occasion than ever before, including several works of a high order, and by well-known men. If it be intended to raise the standard of merit in selecting works for the Exhibition no one can complain, but evidently this has not been the case, while, as we have already said, the decorative and ideal designs are by far too numerous in so small a collection. Mr. G. E. Street, R.A., is well represented by no less than six works, four of which are churches, viz., St. Mary's Church, Monmouth; Holmbury St. Mary, Surrey; the parish church of St. Peter, Bournemouth, showing the spire; and the new church of St. Mary, Speenhamland, Berks. All of these are characteristic of the author's work, full of pure and good detail, and evincing the master's hand. The remaining two drawings will, however, attract the most attention, and deservedly so, as they illustrate one of Mr. Street's earliest domestic works and one of his very latest. They do not in themselves present any leading points for comparison, the buildings being so different in size and intention. The former drawing is a large bird's-eye view of St. Margaret's Convent, Chapel and Schools at East Grinstead (1143); the latter shows mansions about to be erected on the Hans-place estate in Cadogan-square (1174). All the drawings are by Mr. Street himself in his peculiar manner, though perhaps less careful than

usual; but then the wonder is that the author should have found the time to make the drawings at all. We shall return, of course, to these works later on. Mr. Norman Shaw, R.A., has only one drawing this year. It is his diploma picture of Adeote, Shropshire, a work already known to our readers by the illustration given by us just after it was made, in the Christmas number of the BUILDING NEWS last year.* Mr. Shaw could not have chosen a better subject for his diploma work as it illustrates him in that particular phase of Late Gothic, which he had made his own before he lent his hand to the more debased style known as Queen Anne, and considering the lengths to which this last named style have been already carried, Mr. Shaw's truest admirers must certainly desire that he should return to the Gothic work, such as that so charmingly illustrated by Adeote, Shropshire. Even in the present exhibition at Burlington House, where so-called Queen Anne is conspicuously absent, it is refreshing to turn to Mr. Shaw's lone work at the end of the room. Mr. Alfred Waterhouse, A.R.A., has three water-colour drawings, illustrating the Prudential Offices, in Holborn; the New Court Chambers Quad in Lincoln's Inn, and Pembroke College, Cambridge; this last being to our mind the best work of the three as an example of architectural design. Neither Mr. Pearson nor Mr. E. M. Barry send any works, and we miss the drawings of Messrs. W. Burges, Bodley, Gibson, Talbert, and Seddon. Turning to the catalogue Mr. Ewan Christian heads the list, with rather a commonplace though quiet house in Sussex, called Glyndebourne, and immediately below Mr. J. J. Stevenson has rather a striking subject in Ken Hill, Norfolk, shown by a singularly poor water-colour drawing. The house is in stone, treated in "Free Classic," picturesque enough and quaint, but not very like a gentleman's house. Denton Hall, Grantham, by Mr. Arthur Blomfield, M.A., is a more satisfactory and extensive work, though perhaps a little broken up. The drawing is exceptionally cleverly executed in pen-and-ink. The School Board and Municipal Offices (1,080 and 1,114), at Leeds, by Mr. Corson, are shown by very coarse pen drawings, which are deservedly hung rather out of sight; and here we may say, with reference to the hanging, that the pictures are well balanced in the massing on the walls, and with few exceptions have been judiciously appropriated; but why the place of honour in the centre of the long side of the room should have been given to 1,144, a student's aerobatic design for a provincial town hall, by Mr. W. Scott, in which almost all the styles of Gothic have been introduced, we cannot conceive; neither can we understand why the hot and heavily-tinted drawing (1,145) just over the last-named should have been hung where it is, crushing rather than crowning all the adjacent drawings. It represents, too, a very overdone interior, with decorations and furniture in a rather used-up style. Mr. W. Hensman is the author. Messrs. Dunn and Hansom have a neatly-finished view of Downside Monastery and College (1,081); and Mr. E. F. C. Clarke sends a boldly-drawn, if crudely-designed, alteration to the ugly old church of St. Mary at Woolwich (1,082). Skipness is a Scotch house in Argyllshire, by Mr. John Honeyman, which, from the small, quiet view, might be overlooked; it is an unusually good and artistically correct rendering of a much-abused and misunderstood style. Passing a pleasing view by Messrs. Herbert Carpenter and Ingelow, of Knowle House, Wilts, we come to two of the series of four drawings by Messrs. Ernest George and Peto—viz., the "Coffee-house, at Streatham," and "Barrow Point, at Pinner" (Nos. 1,026 and

1,087), the others being "Some Almshouses at Guildford" (1,140) and (1,149) "Some Cottages at Pinner." Of these we may say that all are exceptionally piquant examples of that simple domestic style in which Mr. Ernest George has hitherto practised with so much taste and appropriate feeling, and of the class to which they belong are second to none in the Exhibition. Mr. Eldon Deane's wild and singular design for a convalescent hospital is not badly drawn, but seems out of place in the show, and so does 1,072, a small, uninteresting house at Godalming, by Mr. Ralph Nevill; indeed, we only name it as an example of what should not have been exhibited. Mr. T. E. Coleutt's work is always good, and thus the three lodges at Easton Park (1,093) are in every way suitably treated in half-timber, without fuss or finery. 1,138 shows some stone houses at Nightingale-lane, Wandsworth, by the same artist, though we like these less than the first-named. The interior of Mr. Coleutt's Paris house, 1,176, is very good, excepting the soffit of the staircase, which seems rather heavy.

Mr. Isaac Barradale has some good houses at Leicester, and Messrs. Dodgshun and Unsworth a skilful residence in half-timber, at Shepherd's Spring, Hants. Their staircase from the Stratford Memorial Theatre is less happy. Mr. R. W. Edis has a red brick new house at Eastbourne, shown by a not very pleasing water-colour view, but his principal exhibit is a large pen-and-ink drawing, by Mr. Maurice B. Adams, of the conspicuous new building in Bond-street, at the end of Conduit-street, a work of considerable merit, to which we shall again recur. Of the several designs exhibited of the new Oratory Church at Brompton, the selected design (No. 1,099) deserves to be first named, and, indeed, it has the chief place in the end of the room fronting the entrance. We have this week reproduced Mr. Gribble's drawings, so that our readers may study the work in detail. The interior is the only drawing of this design exhibited, and we regret the unpleasant colouring of the picture, which in other respects is clever, and having an effect of vastness about it not found in the interiors of the other designs which have been selected for exhibition. These include two drawings by Messrs. G. G. Scott, M.A. (1,100, 1,122), A. J. Adams (1,157); Geo. Nattress (1,097), and 1,110 by Messrs. Goldie and Child. To these we shall refer again, and also to Mr. Emerson's beautiful drawings (1,113) of the Tukhtsingji Hospital at Bhavnagar, India, and (1,172) St. Mary's Church, Brighton, showing the tower and spire. No. 1,103 is Mr. Gilbert Redgrave's interesting house from the Paris Exhibition, rather, perhaps, too ornate for a typical example of English half-timber. It is worthy of exhibition here from the importance of the subject; but we fail to gather why the design of Cocoa House, Festiniog (1,106), should have been awarded so conspicuous a place; and certainly Mr. Samuel How's design for a hall (1,109) is utterly below ordinary merit, yet it has a very good place. Mr. Ernest C. Lee just over the last-named has his cottages at Midhurst, in every way good, but, notwithstanding, it is one of last year's rejected drawings. His other accepted work this year is one of the most interesting in the room; we published it the week before last, No. 1,182, "The New Bank at Colchester," nicely drawn by Mr. Gregg. Mr. John O. Scott has but one drawing, it is by Mr. W. Weatherley, of "The Tower of St. Paul's Church, Manchester" (1,112); and Mr. Basil Champneys exhibits close by (1,117) a not very good drawing in brown ink of his "New Divinity Schools at Cambridge," in Late Gothic, treated in a free and masterly way, far beyond any other new work of the kind in Cambridge that we have seen; the drawing, however, does it spare justice. Mr. T. H. Wyatt has a view (1,120) of his "Hospi-

tal for Consumption at Brompton," in a sort of Free Classic in red brick and stone, boldly and simply treated. Here we reach an inky drawing of a design for "The Consumptive Hospital at Hampstead" (1,125), by Mr. W. Tasker, occupying a large space without any apparent reason whatever. "The Grange at Ramsgate," by Mr. Pugin, would be of interest if we could only see it, but at present it is skyed. Mr. T. G. Jackson exhibits one of the most charming interiors in the way of woodwork and colour, that we have lately seen; we refer to 1,126. St. David's College Chapel, Lampeter, a study in late Gothic in green. His other drawing is a sepia view (1,161) of the proposed buildings at Merton College, Oxford, a work not equal to his Examination Schools in the same town. Mr. James Brooks has but one drawing, a nice pen-and-ink interior of St. Modoc Scotland (1,129). Of old work here, we may just name one or two examples in passing as of special merit. (1,098) The Giant's Staircase, at Venice, by John Bunney, a fine drawing in colour; (1,121) by Mr. Charles H. Rew, in pen-and-ink, of the Market Hall, Malines, not Meehlin, as in the catalogue; and the Church of St. Père sous Vézelay, France, by Mr. P. J. Marvin, next to which is an interesting sketch by Mr. J. Twigg, of the Hotel de Ville, Beaugency. By a very red drawing, Mr. Phené Spiers does not flatter his mansion on the Thames Embankment, at Chelsea, a work in Queen Anne of much refinement and character. (1,163) Carlyle House, Chelsea, by W. Adolphus Croft, is hard by, and so claims notice here as a similar work. Mr. E. R. Robson for once has forsaken "Queen Anne" in his Town-hall at Loftus-in-Cleveland (1,152), a simple Gothic building, beautifully drawn by Mr. W. Rushworth. The Grange (1,159), by Mr. J. D. Sedding, seems rather the study of an old work. The Church of Our Lady with Priory, at Marychurch (1,166), by Messrs. J. A. Hansou and Son, is an important work, and (1,173) The Consumption Hospital, at Hampstead, by Mr. T. Roger Smith, deserves notice, and so does Mr. J. Langham's Country House (1,168). As for 1,169, 1,179, and 1,183, the less said the better; they should never have been hung if good work alone is to be exhibited. We have only one more drawing here to mention (1,178). It is Mr. G. G. Scott's design for the new front, or rather alterations to the front of Mr. Haweis' church, St. James, Westmoreland-place. There is much that is novel in Mr. Scott's proposal, and we are not favourably impressed with his design, however ingenious the arrangement of the bells may be in the series of arched openings at the top of the façade on either side and over the clock, where there is a sort of bell turret arrangement. There may, however, be some occult reason for the treatment adopted, as we know that Mr. Haweis is an authority on bells.

Next week we shall notice at greater length both the architectural drawings and the pictures.

THE GROSVENOR GALLERY.

THE exhibition of paintings at the Grosvenor Gallery this year, if it does not surpass, at any rate equals former displays. The present collection affords a varied bill of fare, in which composition, portraiture and genre hold conspicuous places. In the large gallery several important works are to be seen upon the walls, including pictures by Sir F. Leighton, P.R.A., W. B. Richmond, Carl Haag, E. Matthew Hale, H. Herkomer, T. Armstrong, Walter Crane, J. M. Strudwick, P. R. Morris, A.R.A., J. E. Millais, R.A., R. Lehmann, R. Smallfield, A. Legros, G. F. Watts, R.A., J. D. Linton, J. Tissot, J. M. Whistler, and other well-known painters. Mr. W. B. Richmond con-

tributes a few remarkable portraits and studies. We must place his "Sitting in Judgment" (5), "A Study of Light and Shade" (9), and "The End of the Story" in the highest rank for careful colouring and execution. "Sitting in Judgment" has a touch of humour; it is a portrait of a little girl seated in a dark arm-chair with an air of judicial calmness and child-like simplicity. The black dress and dark sombre drapery behind enhance the solemnity of mien with which the child is invested. A "Study of Light and Shade" is certainly clever in the shadow cast by the brim of hat over the face of the young girl, and the face is transparently painted. The portrait of Miss Ada White Thompson is a dreamy face; the eyes are languid and expressive, but the fingers of the hand are evidently too long. More pleasing is "The End of the Story"; a girl seated upon a table has closed her book, and reposes in a pensive mood. Mr. Carl Haag sends two highly finished water-colour heads, one a "Nubian Warrior," admirable in drawing and the finish of the chain armour, and another "An African Beauty." We cannot praise Mr. A. Stuart-Wortley's "Moonlight View of Charing-cross Bridge," it is badly drawn, to say the least, and we have seen better pictures from him. Mr. E. Matthew Hale in "Psyche's Toil in Venus's Garden" (17) has been inspired by a passage in the Story of Cupid and Psyche in Morris's "Earthly Paradise," where Psyche labours in sorting the seeds in Venus's garden. The picture has undoubtedly poetical sentiment in its composition, the figures of the damsels are graceful, and the colours of drapery harmonious, though rather tawdry. The dark background of trimmed hedges of the garden, and the blue pavement, make up a large canvas, somewhat crude and sensational.

Mr. Cecil Lawson's "Kent" (19) is a large picture of a landscape, with a plantation of hops in the foreground, but it is evident the poetic allusion intended to be conveyed of the "jovialman of Kent, as through his golden hops he went," has been lost in the surroundings. It is simply a landscape, with a vast deal of labour thrown away upon it. For composition and sentiment, Mr. W. G. Will's contributions, "Ophelia and Laertes," and "The Spirit of the Shell" (20 and 21), stand high; the latter is a clever, poetical idea, painted with considerable power. Mr. W. B. Richmond has painted a fabulous conceit, called "Sarpedon," but the idealisation is disappointing, in spite of considerable power and careful painting. Perhaps one of the most remarkable, because natural, pictures, no less wonderful for its execution than for the sentiment introduced, is Mr. Herkomer's "Light, Life, and Melody" (24). It is painted in pure water-colours, though it has all the solidity of oil, and, we believe, is partly intended as an experiment to test the capability of the former vehicle. The scene represents Bavarian peasants seated in a Kegelbahn, listening to the strains of a zither being played by a hunter. Behind the player is the standing figure of a girl, moved by the melody, while peasants are seated round, listening and conversing together. Beyond, in the distance, are seen blue hills. In conception, Mr. Herkomer has seized upon a subject that brings into full play his marvellous aptitude for character portrayal. The old men conversing are yet enthralled by the music, and the artist has produced every effect but the sound necessary to the realisation of the scene before us. The figures are relieved by sharp lights scratched from the paper, the tanned countenances of the old men and the reflected light on their faces are realistic, though broadly handled. Several sheets of paper were necessary, we are told, to produce so large a picture, and these have been joined in the lines of contour of the figures. The same painter has sent a life-size

portrait of Alfred Tennyson (49), in which the poet-laureate is shown dressed in a cloak. The execution has all the depth of oil and dark background, setting off the fine head and flowing hair. His other contributions in water-colour are of minor interest. "Auf der Alm" (251) is forcible in colour and the drawing of the mountain peaks. A few spirited etchings are also exhibited in the sculpture gallery. In decorative or ideal subjects the present exhibition is full of interest, if we cannot say excellence. Mr. T. Armstrong, Mr. Walter Crane, and Mr. E. Burne Jones this year carry off the palm. Mr. T. Armstrong's "Fountain" (27) is graceful in conception; the colouring is harmonious and refined, and the painter has wisely selected tints of a low scale. We cannot say we are much entranced by Mr. Walter Crane's piece of "The Sirens" (28). Can we call them siren-like? The three figures in a light subdued tone of colour, are certainly wanting in contour; in the centre and right hand figures the lines of neck and shoulders are ungraceful. The other contributions by this artist are better, and to some of them we shall refer further on. Mr. Britten, in "Musie" (32), has scarcely given us the ideal sentiment suggested by his theme; the figures are wanting in grouping and composition, and the faces wear a wild expression that looks out of harmony. We hardly know how to estimate at its real worth Mr. C. E. Halle's subject "To God and My Lover's Right Arm." If it is intended to be figurative, it certainly misses the mark: we cannot call it idealised; yet there is a Titian-like richness of colour, breadth of light and shade and manipulation, that give evidence of power, irrespective of the scale attempted. It forms at least a striking subject from the Vestibule gallery: the mounted female figure is illumined and painted with effect, and distance certainly "lends enchantment" to the picture. For idealised and refined sentiment Mr. J. M. Strudwick's work always charms. His subject No. 35, from Solomon's Song, v. 2, "My beloved is gone down into his garden, to the beds of spices, to feed in the gardens and to gather lilies," is a small picture, in a low scale of colour and in a conventionalised style of drawing, that reminds us of the earlier Italian school. There is much delicacy and tenderness in the treatment. His "Isabella" is also a composition remarkable for a pre-Raphaelite mannerism and fine, almost mechanical, execution, combined with emotional tenderness in the piteous look of Isabella; the architectural detail is weak. "Night and Sleep" is the title of a large painting by Miss E. Pickering, displaying much imaginative power. The composition, drawing, and colour are skilfully managed in the trailing garments of Night and the falling blossom from Morpheus. The little panel subjects by Mr. C. Fairfax Murray (38 and 39) are rich in composition and colour; while in another branch "Ship-building" (43) is a clever study of figures and river-side, painted with much truthfulness. We note also near Lady Waterford's picture of "The Wise Woman's Briar," founded on an old superstition, rich in colour, though crude; and Mr. J. R. Weguelin's "Tired Dancer" (45), graceful in composition the flowing red tarlatan drapery of the dancer being well drawn, and with dramatic effect. But we must pass on, noticing "The Widow's Acre" (51), by Mr. G. Boughton, a vigorous mellow landscape, and Mr. R. B. Browning's "Unanswered Question" (52), an old man holding a skull deep in the thought it inspires—the last powerful and touching; a portrait by Mr. Millais (53), till we come to two remarkable life-size studies by Mr. J. M. Whistler, that will probably attract attention, if not admiration. No. 54, "Arrangement in Brown and Black—portrait of Miss Rosa Corder," is a gracefully painted portrait of a young lady in the two sombre colours, quite intelligible; but the

next, "Harmony in Yellow and Gold—portrait of Miss Conno Gilchrist," excepting the harmony produced by two shades of yellow—raw sienna is the nearest approach to the tone—can scarcely be deemed more than an unfinished picture in which the artist had only rubbed in the shades of colour for after-finish. The drawing is coarse, stiff, and formal. Very dreamy and streaky is the same painter's "Harmony in Green and Gold": the harmony is certainly there, but it is the harmony nearly every painter's work assumes that is not finished. But we believe Mr. Whistler belongs to the school of "Impressionists"; we therefore beg pardon. Mr. Lawson's picture (57), "A Silver Mist," Mr. R. Lehmann's "Convent Dole," are both clever; the latter is very feeling and rich in tone, and sustains this master's reputation as a figure-painter. Mr. A. Legros sends a large canvas, "Jacob's Dream," powerful in colour, though the recumbent position of Jacob is awkward. His "Study of Head" (64), painted on the bare canvas, is clever. Mr. Morris, A.R.A., exhibits, as usual, some pleasing subjects, one, "The Holiday," girls skipping, and "Autumn." Mr. Macbeth's "Our First Tiff" (70), a young lady and gentleman under a huge yew-tree; the latter is reading a newspaper, and does not respond to the attention of his fair partner. The subject is pleasingly painted and minutely finished. At the end of the large gallery we come to two striking pictures by Mr. G. F. Watts, R.A., both classical, and exhibiting masterly composition. "Paolo and Francesca" is stiff in the drapery, but the gray tints and the handling are forcible and suggestive. "Orpheus and Eurydice" (74) is grandly conceived; the figure of Orpheus, who is apparently represented bearing his dead wife, is finely drawn; but the undraped figure of Eurydice is painted unnaturally, and can hardly be called successful. The same artist exhibits a portrait of Mr. Gladstone. Mr. J. D. Linton's "Les Emigrés," is one of the best of his pieces, and there is some clever painting in it, stamped by much feeling and expression. His "False," and "Early Scene from Gil Blas," are highly-finished pictures, with much dramatic power. We have before alluded to the latter. We remark "Little Elaine" (71), a softly-painted, childlike face, executed with considerable feeling, by Mrs. Anderson; "A Decorative Centre-piece," by Mr. W. Crane (72), symbolic of the seasons; and some highly finished studies by Mr. James Tissot, whose "Orphans" make an attractive picture on the walls. The "Hamnock" is a pleasing study of home life, carefully and brightly painted. In the east gallery we note casually a broad bit of foliage called "Mark-Ash, New Forest," by W. Kämpel, a life-size full length sitting portrait of Thomas Chapman, Esq., F.R.S., by Mr. E. J. Gregory; "Perdita," by F. Sandy; "Weed Burners," by David Carr, treated decoratively; Mr. Mark Fisher's "Spring," (137), a cleverly handled study of blossom; "Dorothy," by Mr. G. F. Watts, R.A.; but Sir Coutts Lindsay's "Ariadne," is the lion of this gallery: it is boldly conceived and luminous—scarcely the ideal figure we have in the Homeric account certainly—but still refined in drawing and in the treatment of drapery. The blue sea makes a good background to the draped figure, and the pose, modelling, and turned head are graceful. We must not overlook a charming monochrome painting by Mr. J. D. Connor, "Staircase of Burgos Cathedral." The handsome scrolled ramps and flights of this interesting Renaissance church are drawn with exquisite care and feeling. Refined in sentiment is Mr. Stillman's "Pametta Singing" (158), while Mr. Staple's "Not at Home" is clever in drawing, light, and shade. Mr. Walter Crane's "Panels for Decoration" are bas-

reliefs conceived in a thoroughly Classical spirit, and intended to be executed in bronze. They are perhaps rather severe in outline, and the panel representing "Evening" is one of the best of the four. Mr. E. Burne Jones occupies a large space of the east gallery; one subject he has chosen is a classical fiction, the story of Pygmalion, told in four tableaux. The first, "The Amuniation," is a life-size representation conceived in too prosaic a spirit to commend itself to us. The bay-tree, the porch, and the standing figure of a woman, are mannered, and are not suggestive of much beyond. The other four subjects are skilfully drawn in low tone, and tell the myth with much feeling. Mr. Albert Moore sends a pleasing figure-subject called "Topaz" (172), in which the artist has endeavoured to give us a symbolised treatment of the gem; and it must be confessed that in the choice of the tints and the drawing he has succeeded. It represents two figures of maidens standing against a background of light, gold-figured drapery; they are clothed in graceful vestments of light green, and have necklets of pearls, and a topaz in one of them. The head of one of the figures, relieved by shadow, appears to stand out like a relieve from the draped background, and the whole conception is delicately handled and suggestive. A study of a girl's head, by Mr. G. E. Hicks (175), is clever; and Mr. A. F. Payne's "Dream Life," a girl musing over a book, with a rich, tapestried background, is admirable in execution and tone. In the vestibule we see Mr. Whistler's pieces, "Nocturne in Blue Green," and "Blue and Gold" (192, 193), in a style which has lately given rise to so much ill-merited attention and criticism in high quarters; and a few other subjects, one of the best of which is Mr. W. T. Richards' vigorous coast scene in New England (195), and some pieces by A. Hertel, Miss Stuart-Wortley, Miss Defries, R. Lehmann, J. O'Connor, Kennedy, &c. In the water-colour gallery the chief pieces are by Mr. Richard Doyle, remarkable for some broadly-sketched foliage. His "Pied Piper of Hamelin" is suggested by a passage in Robert Browning. No. 235 is another bold sketch. We also note Nos. 251, 248, 256, 267; but the water-colours certainly do not sustain the reputation of painters in that school.

NEW BUILDINGS IN THE CITY.

THERE are some signs of architectural activity in Fleet-street and Ludgate-hill, which indicate the expiration of leases and the continuance of the reconstruction of these noted thoroughfares. In many instances the premises which line this central artery to the City have long outlived their original design and purpose; shops which fifty years ago might have answered the demands of trade are now beyond alteration, and one by one we see new fronts taking the place of the old ones, extensive premises, where possible, having been built beyond the original limits of the buildings upon the areas in the rear. Every now and then a clearance of a few houses takes place and a gap is made, which is filled quickly with new houses; though, beyond the greater conveniences conferred upon the tenants themselves, we fear the admirers of the old street will have little to be thankful for on account of the change. Unfortunately, the rebuilding of our old City streets must be regarded, even from a sanitary point of view, rather as a calamity than otherwise, as it is invariably the substitution of larger and more obstructive buildings for smaller ones. In every instance a considerable reduction of light and air takes place, injuring not only those who live close and in the rear, but also those on the opposite side of the street. The process of rebuilding certainly

results in improvement in some other respects. It allows for the reconstruction of old walls and foundations dilapidated and dangerous, crumbling with rotteness or saturated with unwholesome matter, and it enables some of the provisions of modern sanitary science to be carried out in their integrity. These are unquestioned benefits. If we take, for example, the opening up of the dense mass of premises between St. Paul's and New Bridge-street in Ludgate-hill, a decided public improvement has been effected by the removal of a nest of dilapidated houses of the most rotten and unstable description. Moreover, in this instance the setting back of the line of frontage in Ludgate-hill about 15ft., and the formation of an open space, has conferred an immense boon on the occupants. It may be of interest to notice how architectural considerations have been met in these alterations. In Ludgate-square one or two warehouses have been built having some pretence to artistic effect; but the treatment of the recessed frontage towards Ludgate-hill can at present only be judged by a narrow stone facade to some premises destined for the "Capital and Counties Bank." The elevation is in a plain, panelled pilaster style, the windows being closely set and separated by pilasters which run through all the stories, with the horizontal divisions slightly broken round them between the window openings. The chief merits of the style is that it is quiet and devoid of affectation or carving, the main effect being got by the vertical - moulded lines and discontinuous horizontal members. On the cornice of the second story is an iron balcony railing, above which the upper story forms a kind of attic. We understand the architects are Messrs. Joseph and Pearson. On the other side of the opening into the square we believe similar premises are to be built, the upper stories being carried by iron staircases, one of the least satisfactory necessities of street architecture in crowded cities. In Farringdon-street, adjoining the Congregational Memorial Hall, Mr. Vickery, architect, is engaged upon a lofty block of buildings, apparently intended for offices. The front is of red brick and stone, of Italian design, though there is little to remark upon, except that stone arches and carved capitals will be rather strong in the elevation; but the scaffolding prevents at present the formation of anything like a critical opinion on the work. One of the most remarkable new buildings in Fleet-street, not far from Messrs. Collinson and Lock's pargetted front, has been erected lately from the designs of Mr. T. Knight, of Cornhill. Between the second and third stories is a long panel in red tiles, with majolica mouldings, in which the name "The Popinjay" is inscribed,—inaccurately spelt with two p's, by the way. What the connection of the name of that bird has with the present building is not very apparent, but an alto-relief in stone of the bird itself occupies a canopied niche between the first-floor windows, while from the label mouldings above them are medallions of rococo design, with heads carved in the red Mansfield lintels, and represented as being suspended from the centres. A tablet, also inscribed, is introduced between the second-floor windows. These introduced features have more the recommendation of novelty about them than anything else. At any rate, we think Mr. Knight's building would have lost little by their omission, except that the other features of the front would not have attracted the passer-by. Red brick, with Mansfield stone in the carved portions, and lintels, have been used, but the brickwork has suffered much from a white efflorescence or "salt-petring." In the treatment of the ground story we think an opportunity has been lost in not taking advantage of the open passage which occupies a portion of the frontage.

The pilasters, of red, polished granite, and the caps, are weak. Interiorly, above the shop, several large and well-lighted offices are obtained, approached by a spacious staircase, entered from the passage, and these will no doubt be readily let.

A few yards nearer the Strand a large gap till recently occupied by old houses half built of timber, has been filled by two new buildings. The largest and most important of these is intended for a new hotel. It is of red brick externally with stone introduced in the window dressings and lintels. The façade, from its present appearance, is intended to be in a sort of Renaissance, and to display a little variety in its treatment. On one side of façade is a bay window of stone with angle pillars and carved capitals, while on the other side the windows are large flat lintelled openings with pilastered jambs. A wide corridor entrance relieved by pilasters leads to the principal staircase, and forms a feature in the elevation. Messrs. Ford and Hesketh, of Aldermanbury, are the architects, and Messrs. Browne and Robinson the builders. On the east side is a smaller front, erected by Mr. Hobson, builder, in white brick and red dressings, the only feature of any remark being an arched entresol. These two buildings occupy the frontage of several old houses, and are considerably higher than the adjoining buildings. Undoubted opportunity for architectural skill is met with in Fleet-street in the management of the passages and alleys that exist on this north side, and in preserving as much as possible the associations connected with this famous thoroughfare. Between St. Dunstan's Church and Fetter-lane there are two old houses of much interest archaeologically as excellent examples of 17th century London. One is occupied as a secondhand bookshop. These houses still retain the old two-storied bay windows, with their richly-moulded and dentilled cornices, and the balconies above. The sides of the houses are still enriched by the Ionic pilasters, and, with the gabled tops and cantilevers to balcony, suggest to us a rough idea of what Fleet-street was in the earlier days of the Revival. They are thickly-coated with plaster and paint, and are chiefly of timber construction. We may express a hope that these will be tenderly dealt with when they come to be removed, as in all probability they will before long. Another block of four old houses, with even greater architectural pretensions, opposite St. Mary-le-Strand, call for equal consideration. In these the fronts are entirely of timber and plaster; the architraves and window dressings are richly moulded and carved, and exhibit the classic taste of the Stuart period. Pedestrians cannot fail to observe another improvement at the junction of Fleet-street with the Strand, namely, the removal of the hoarding opposite that portion of the new Law Courts that has recently become occupied, an additional width of pavement having been thrown into the street by this and the concurrent clearing away of the stump of the northern pier of Temple Bar. The removal of the barrier has given an opportunity for a more complete estimate to be formed of this portion of the great work of Mr. Street. The eastern tower is now revealed in its full proportions. We cannot quite agree with one of our daily contemporaries that the structure is something between a church tower and a chimney: it has far more of the fortress character of the towers of feudal France in its composition; and the least successful part of the design is the flat heavy buttressing at the sides of the eastern quadrangle archway. Shortly the block of houses between Bell-yard and Chancery-lane will have to be dealt with, and an opportunity will be offered for an architectural frontage of some importance.

Mr. F. W. Stocks has been appointed assistant surveyor of Accrington.

MR. STREET ON ART CULTURE.

SCHOOL OF ART prize distributions have lately been made the occasions of art utterances and the policy of art students, much after the fashion set by ex-Parliamentary orators. Mr. G. E. Street, R.A., has been lecturing to the art students of Sheffield as Mr. W. Morris did not long ago to a Birmingham audience of students. Mr. Street's address—to which we commend the attention of our readers—will be found fully reported in our last issue. The former gentleman, in some clever remarks, deplored the debased taste of the nation, but scarcely gave us so much as a hope of improvement; Mr. Street dealt with the same subject in a more practical manner, and while lamenting the general art apathy of the English people, does not despair of redeeming them. The remarkable conflict between artistic impulse and civilisation was explained in a far more satisfactory manner than we have been accustomed to hear, though to any intelligent mind it is simple enough. Mr. Street observes: "It is indeed a truth about which we cannot have any doubt whatever, that there is a certain kind of civilisation which whilst it raises some men, tends to debase the majority to a very low level in all matters of taste, and in all natural artistic development and expression. The reasons for this do not seem to me to be far to seek. The perfection of machinery, for instance, enables an enormous number of men to earn their living by perfectly adapting themselves to one process, to the complete exclusion from their thoughts of all others. And such a mode of work involves consequently a loss of intelligence, which is hardly compensated by the perfection to which the machine—and the man as part of the machine—succeeds in attaining." We commend this only logical way of looking at the question of what we may here call "Machinery versus Intelligent Labour" to those who are for ever wondering how it is, and deploring the fact, that the civilised modern workman cannot give us half the beauty and the interest of the workmanship of former times. But though we may lament the result, it is ridiculous for us to wish for a return to the old system, to protest against machine labour as the cause of artistic degeneracy. We might as well find fault with all our civilising agents. It is not the machine so much as the man that allows himself to become part of the machine that is at fault. As Mr. Street said, nothing that the workmen of former days did "was ever absolutely vulgar, hideous, or commonplace, or false in its mode of dealing with material, or in its suitability for its purpose." Every piece of old furniture which our cabinet-makers and connoisseurs copy and go in raptures over just now, exhibits thoughtful labour, as we have before hinted, rather than time-saving labour. The question at once suggested, is how to correct this state of things, and Mr. Street thinks justly that it is not merely the imparting to our students the mere faculty of drawing, as the power of discrimination between good and bad in art. We venture even to say that our Government schools have taught too well the mere mechanical modes of execution, and have neglected the culture of the power of discerning good from bad art, or beauty from deformity. They have done excellent service as regards the penmanship of art, but they have not so thoroughly taught the student to rely upon his own resources in the power he has or should have of perception. The mode of instruction is to give the pupil an example of flat ornament—it may be a portion of a frieze to a building he does not know, and certainly is perfectly ignorant of its purpose or position. The ornament is copied and the mere exactitude of the reproduced drawing is looked upon as the test of the capability of

the student. Prizes are bestowed for the excellence of the drawing—not upon the artistic perception of the pupil. It is this system we have always deplored as well in the Government schools of design as in the training of the young architect. It tends to the making of copyists and drawing machines, not intelligent artists. Mr. Street might have added that the mediæval workers had no schools and no drawing facilities. There is undoubtedly more to be learnt by seeing and thoughtfully examining our museum collections, than in simply copying in a vacant, mechanical and listless manner. Again, the lecturer said, whatever is to be "in frequent use and constantly before the eye, may be an artistic work and ought—if it is ornamented at all—to be ornamented well." We desire to emphasise the little word "if" because Mr. Street's meaning is not fully understood without it. The curse of modern art has been ornamentation—something added for the sake of making an object "pretty" or attractive, and to make it worth more, and it is very certain that the true artistic meaning of this word is not intelligible to the ordinary art student or decorative artist. The value of the museum and such collections as those of South Kensington was rightly insisted upon as furnishing the *motif* of the old artist in the hammered metal work and other domestic utensils of his day.

But one of the leading principles inculcated by Mr. Street was self-reliance upon the eye and hand. The study of the human figure is of course placed first. He said:—"The mere habit of drawing well and carefully from the life, or from the purest antique sculpture, gives a natural sense of the beauty of lines and curves such as cannot be obtained in any other way with equal certainty." The difference in this respect between the sculptures of the Parthenon and the later Roman work was pointed out. Mathematical accuracy and repetition were strongly repudiated, as productive of monotony, and the most certain evidence of poverty of invention and artistic feeling; and Mr. Street very plainly enunciated the proposition, and very forcibly dwelt upon it. One of the advantages he claimed for the human figure was that it led the student "insensibly to indifference for some qualities which at the present day have great and most noxious influence throughout this country." Accuracy of workmanship, and exactitude to the minutest points of line and colour, are without doubt overrated and ordinarily esteemed as one of the necessary conditions of artistic merit; but Mr. Street endeavoured to disabuse the minds of his audience of the idea. So long as exactness and repetition are aimed at, we cannot expect to see real or feeling art of any kind; the two cannot co-exist. The "variety which is absolutely incompatible with exact accuracy of execution is really the highest quality which any of man's works can have." This will appear to some the language of the enthusiast; but Mr. Street exemplifies the principle in his own works to perhaps a greater extent than many, and no one with any real art feeling can deny that it is one of the most powerful sources of beauty both in nature and art. "There is nothing," it was said, "that has done so much harm to the art of design as the too-frequent dependence on mathematical drawing instruments. If a man wants to design an ornament, he brings all his dividers and his bow pencil. He divides out his ornament with an accuracy which aggravates us, and never trusts to his hand to draw a curve whilst he can get his bow pencil to do one for him." Few, we should say, are so ignorant of Greek art as to believe the best Greek ornament was entirely an affair of the bow pencil, though the observation upon this was well-timed. The tracing and repetition of set forms was well censured as a most pernicious mode of designing ornament, and we commend

especially these remarks to the student. Mr. Street's illustration of the value of dependence on the eye and hand in the old Venetian glass and the Doulton ware was admirably to the point; he showed in this instance what may be showed in other manufactures, that the aim of the Venetian glass-maker was entirely opposed to that of the English artist, who conceives absolute uniformity necessary to good work. But our chief business here is to recall a few points in Mr. Street's address to the student's attention rather than to comment upon them. No other utterance has appeared for some time past so full from beginning to end of such valuable maxims so moderately enunciated, and so free from the extravagances of sentiment and expression to be found in the teachings of some masters.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

DISCUSSION ON ARTISANS' DWELLINGS AND THEIR IMPROVEMENT.

AGREEABLY to our promise last week (p. 443), we give below a report of the two nights' discussion at the Institute which followed the reading of Sir James Watson's paper on "Improvements and Artisans' Dwellings in Glasgow."

After the reading of the paper, the PRESIDENT said Sir James Watson had opened a critical question, that of improved dwellings for the poor. There was no need to inquire as to the necessity for such; the problem was, admitting the need, how unhealthy houses could be demolished and better ones erected, so as to be within the sum that could be paid as rent by the very poor. The pecuniary difficulty of housing this lowest class was so great that he believed even the company of which Sir Sidney Waterlow was chairman had shrunk from facing it. Various items in the outlay involved—the cost of erection, of maintenance and repairs, rates and taxes—could not be economised, but he suggested that the expenditure on land might be. It would be well if the Metropolitan Board of Works would let their vacant lands for this purpose at a low figure, or even offer it gratis to facilitate the objects of the companies who sought to provide accommodation. The great water and gas companies ought to feel also that they had a public duty to perform and should reduce their charge below the ordinary scale. He saw in the room Mr. Torrens, M.P., who had contributed a valuable article on this subject to *Macmillan's Magazine* of this month, and they would be pleased to hear from him how his Act of 1868 could be made something more than a dead letter.

Mr. W. T. McCULLAGH TORRENS, M.P., explained that the Artisans and Labourers' Dwellings Act of 1868, known by his name, was completely altered and its most useful provisions destroyed when in the House of Lords, so that the Act was in reality only a fragment of the measure he proposed and of that which the House of Commons approved. Lord Westbury and others thought they knew better than the promoters of the Bill what was wanted, and held that if the ground were only cleared of unhealthy dwellings, private enterprise would step in and do the rest. What had happened? After eleven years' trial there were acres of land in London lying as bare as churchyards, while the unhappy inmates, who once found some sort of shelter on the site, were still more closely cramped up and saw this vacant space lying idle year after year. With the noble incentive before them of what had been done in Glasgow, and the horrible condition of some parts of London, he, as a member for a metropolitan borough, would implore his hearers to urge on the Legislature the necessity, for manners and decency's sake, not to allow things to go on as at present for another session. He had brought forward a bill identical with his former one as it left the House of Commons, for the extension of his Act, which would soon expire from flux of time; but if this were not the best means of abating the nuisance, he would gladly support a better. Slums would never be eradicated from towns; they might be reformed and would relapse from time to time. The work therefore must be continuous, the powers to grapple with the evil ought to be placed in the hands of a local authority, so that

local knowledge and interest may be brought to bear upon the work of demolishing, repairing, and rebuilding. He appealed to all to bring their moral influence to bear on the Legislature in this matter. He highly congratulated Sir James Watson on what had been done in Glasgow, and wished they could follow so good an example in London.

The PRESIDENT wished to ask Mr. Torrens two questions: What were the proposed improvements in the Act of 1868, and what moral machinery would he recommend for influencing the Legislature?

Mr. TORRENS replied that the Bill of 1868 would be re-introduced as it left the House of Commons, but amendments would be made in it in committee. Its powers would be made compulsory and not permissive, and it would aim at renewing and replacing unhealthy and overcrowded dwellings by a slow and gradual process. It was a piece of cruel hypocrisy to say that the working population could go out of town. Let them go out of town? Let them go to the devil! How could the very poor be expected to come several miles to work in such weather as we have had? As to the second question, he could not venture to suggest the mode in which the members of the institute should exert their influence on Parliament: he could but point out its desirability.

Sir SIDNEY H. WATERLOW said, after an experience of 15 years in attempting to provide houses for the poor, he seemed to have come to a dead-lock. He had pointed out to the Corporation of the City of London that they had had land lying idle for 40 years because of the restrictive price they set on it, whereas if they had even given it away it would have paid on assessments more than they could possibly hope to realise in the future. The Metropolitan Board of Works, in a similar way, had land on hand because they estimated its value so highly that it could not be taken up and made to pay. Of eleven sites set apart, under the Act of 1872, for artisans' dwellings, only three had been built upon, and of these but two were as yet in occupation, and yet every facility was availed of for letting. In this the Metropolitan Board of Works were not to blame, as they were dealing with the money of ratepayers, and it was their duty to get a fair price; but the defect was that the increased value of assessments realised by early letting was an argument which had no force with the Board of Works, as it was an aggregation of vestries, and the profit would fall to an individual vestry. What the Board ought to do was to put the land up to auction, and, if the reserved price were not bid, to wait a few weeks and try again. If after three or four public offers by auction no one would offer the price asked it would be apparent that it was beyond the market value, and the Board would feel that it was doing its duty in accepting the highest offer. He believed the highest sum paid for land in Glasgow—1½d. per foot—was one at which the land could be remuneratively covered. The company of which he was the chairman had offered the Metropolitan Board of Works twice that sum for sites, but it was declared to be insufficient, although the company had found no difficulty since in purchasing land of private owners at a lower rate. His company had spent nearly half a million of money in the prosecution of its aims, and when he told them that they had never had any trouble as to lights, &c., it would be understood that some discretion had been used in planning and building. There was very much to learn from Sir James Watson's paper, and the author was much to be congratulated on the success achieved. It appeared that in that city the demolition had been very gradual, and new houses were provided faster than others were pulled down. This did not seem possible in London. The model of a Glasgow lodging-house he had only seen for the first time, but he highly commended the plan and arrangements. He concurred in what the President had said as to the duties of water companies. His company had found great difficulty in this matter, as the water companies positively refused to allow their tenants to be supplied by meter even at the highest rate. What had been done by his company was to have large tanks on the roofs of the dwellings, and allow the tenants to use from these freely. If the supply ran short the waste was traced as far as possible to the particular tenant. An alteration was about to be made in the terms of the Public Works Loan Commissioners, which would, if the Bill

were carried, seriously increase the cost of borrowing money at the outset when it was most difficult to raise funds; and he trusted this would not be made applicable to societies like that with which he was connected.

Mr. VULLIAMY explained the plans of the eleven schemes now being carried out under Mr. Cross's Artisans' Dwellings Act by the Metropolitan Board of Works. They provided for blocks of buildings of four or five stories high, with streets and spaces 30ft. wide between; the spaces at the rear were to be asphalted and could be used as playgrounds by the children. The only site entirely cleared was that portion of the Limehouse and Whitechapel scheme, to the east of the railway; but no response had yet been made to the offer. In the Bedfordbury and Old Pye-street, Westminster, schemes the arbitrator, Sir Henry Hunt, had given his final award; the other eight were in less forward stages. In reply to Mr. Charles Fowler, Mr. Vulliamy said his own opinion was that the price asked for the land was too high, but, of course, he was but the servant of the Board. In any case, the dwellings must to some extent be provided at the cost of the ratepayers.

Mr. HOLLACE JONES described the two schemes in the City. Both had been executed, but they paid the undertakers barely 4 per cent.—not a sufficient return considering the cost of removal. The price paid per foot was 6d., and he thought that too much.

It being now twenty minutes to 11 p.m., the President proposed an adjournment till the following evening.

TUESDAY.

The adjourned meeting was very thinly attended, only a dozen members, in addition to the President and Secretary, being present throughout the evening.

In reply to a series of leading questions from the President, Sir JAMES WATSON said the builders of Glasgow could not give more, upon an average, except near the centre of the city, than 30s. per square yard for land upon which to erect working-class dwellings, equal to 1½d. per foot per annum; they considered that no higher price would repay them 6½ to 7 per cent. on their outlay, the usual rate of profit in the Glasgow building trades. This was for the freehold of the sites. He could not say as to the cost of maintenance and repairs, nor the average of unoccupied dwellings, as the management of the properties did not remain in the hands of the civic authorities. Sir James explained the arrangement of the model lodgings by a wooden model on the table. It was intended for single people, and consisted of a stone walled house, divided on each floor by wooden partitions into a series of narrow compartments, so planned in pairs that a recess in one afforded a sleeping berth, while on this in the next cubicle rested a second berth reached by a flight of steps. The cubicles were 10ft. high, had cross ventilation, and were lighted above the doors; the average capacity was 960 cubic feet for the pair. In the model lodgings, while the walls were of stone, the floors and cubicle partitions were of wood; the authorities were considering the advisability of compelling these to be made fire-proof, and especially of enforcing iron partitions. He had himself been for many years a manager of a trust, to provide these lodgings, on the basis of aiming at a return of 5 per cent. on the money borrowed, and giving any surplus to a charitable institution. The trust had three blocks of lodgings, two for men and one for women, which they let at 3d. per night per cubicle, throwing Sunday in. They did not pay for some years, but the result of thirty years' trial had been that they had returned the stipulated 5 per cent. dividend, including back payments for the years of struggle, and had handed over to the Royal Infirmary donations from the surpluses amounting to £16,000.

Mr. JOHN HONEYMAN, of Glasgow, mentioned that when the scheme for artisans' dwellings was under consideration the municipal authorities engaged five of the principal architects, not in competition, but each retained by an honorarium, to give their professional opinion as to the best mode of covering the vacant ground with dwellings. He had the honour of being one of the architects so engaged, and considered the method one that might well be followed in other towns. However successful the Glasgow corporation and the trust might be, he did not consider that they had solved the real problem, how

to provide for the very poor. As far as that object was concerned, not much encouragement could be gained from the operations in Glasgow. The policy adopted there had been to disperse the working population; he thought it a mistaken one, and that it involved much hardship for the poorest class. The dispersal was enforced because of a mistaken idea of a connection between density of population and health and mortality, but under good sanitary conditions a dense population was as healthy as one more widely scattered. The great aim should be to provide cheap and comfortable dwellings for the extremely poor as near as possible to their place of work. Where the water and gas works were in the hands of a corporation that body might be fairly asked to reduce the rates. When municipal authorities offered land for these purposes it was not wise to ask too high a price, nor to burden the builder with unnecessary restrictions as to height of stories and vacant areas. Replying to a question from Mr. Wyatt, Mr. Honeyman said working-class dwellings were erected in Glasgow for about 6d. per cube foot. If in London buildings of this class could be erected after paying from £3 to £4 per square yard for the site, the builders of Glasgow had much to learn from the metropolis.

The PRESIDENT read figures furnished him by Sir Sidney Waterlow as to the cost per cube foot of the blocks of dwellings erected by his association between 1865 and 1874, from which it appeared that the cost varied from 5d. to 8½d., but that the average was 7d. During the last four years the President said he had had some experience in the erection of this class of dwelling as architect to the Victoria Artisans' Dwellings Association. He had found that if they gave the tenants some degree of comfort, and yet built as cheaply, by which he meant as substantially and plainly as possible, the association could not build under a cost of 7½d. per foot cube. The dwellings referred to at Battersea and Stroud Vale were widely different to the simple lodgings of Glasgow. They were self-contained tenements, of from one to four rooms each, with closets and water to each, but with one w.c. to about four tenements. This was found a sufficient number for tenants of the class provided for, and considerably economised space and original outlay on fittings.

Mr. SMITH remarked that he had recently visited several towns in the north of England for the purpose of seeing how the artisan classes were housed. In several he had noticed that even in classes of houses that let at from 2s. 6d. to 5s. 6d. per week, the closets of a group of from four to eight houses were arranged in a nest or clump at the rear of the premises in two streets; these closets were on the dry system, and were kept in order by the corporations. He thought the plan of arrangement might be usefully followed in London.

Mr. JENNINGS, sanitary engineer, at the request of the President, exhibited and explained the construction of several appliances which he had invented and put up for use in the Victoria dwellings at Battersea, built from the President's designs. One of these was a sink which had a long narrow slit in place of the ordinary holes, so that the water could run off more rapidly, while by the use of a slide the slit could be closed, and the sink used as a wash-tub or other water receptacle. An other was an invention to supersede the costly and easily-damaged water-waste preventer in water-closets. It acted on the principle of the school-boy's leather sucker, which, when moistened and placed on a stone, will adhere to the stone for a few seconds owing to the pressure of the air. In the case of the closet, a solid piece of leather is placed beneath the handle, and is moistened from a bottle of oil. It sticks to the lower part of the handle for five seconds, during which time about two gallons of water can escape, but if the handle should continue to be held or triggered up the leather falls, and shuts off the water. A third was a form of trapless closet.

Mr. MARK H. JUDGE said the difference between the success of artisans' dwellings schemes in London and Glasgow appeared to be due to the fact that in the latter city there was but one governing body, whereas in London there were many. The model lodgings explained by Sir James Watson seemed, like ragged schools, to be rather a disgrace to the community, and at best but a temporary expedient for sheltering a population which had no homes.

Mr. FOWLER observed that Mr. Torrens's new

scheme acted on a principle which must render it as ineffective as the old Act of 1868; Mr. Torrens again proposed to place the power in the local vestries of the metropolis, who were not fitted to discharge the duties.

The PRESIDENT, in closing the discussion, suggested that associations endeavouring to provide dwellings for the poorer classes should be granted every facility. A local authority ought to let them the land where they possessed it, at a reasonable rate, so as to allow of a return of 5 per cent. on the outlay; the mode of assessment for rates should be rendered more equitable, and water companies should be compelled by the Legislature to supply the tenants at a fair price. In return for these special advantages, Parliament might fairly restrict the dividends of these associations to 5 per cent., at which rate there would be no difficulty in obtaining the requisite capital.

Sir JAMES WATSON having replied upon the discussion, a vote of thanks was accorded to him for his paper.

THE INSTITUTE DINNER.

THE astuteness of the council of the Royal Institute of British Architects in inviting the Prince of Wales to be present at their annual dinner was exemplified on Saturday evening in the numerous and distinguished company who assembled at the Freemasons' Hall to meet His Royal Highness. The President, Mr. Charles Barry, occupied the chair; the Prince, who wore the Order of the Garter, being seated on his right. The company, which numbered about 260, included the Marquis of Hamilton, M.P., Lord Houghton, Lord de Lisle and Dudley, Sir Alexander Cockburn (Lord Chief Justice of England), Lieut.-General Sir D. Lysons, K.C.B., Sir Seymour Fitzgerald, G.C.S.I., Rear-Admiral the Hon. H. Carr Glyn, C.B., C.S.I.; Rear-Admiral Sir Beauchamp Seymour, K.C.B., Sir F. Leighton, P.R.A.; Mr. W. Spottiswoode, President of the Royal Society; Mr. Beresford Hope, M.P., Sir Coutts Lindsay, Bart., Sir R. Wallace, Bart., M.P.; Sir P. Cunliffe Owen; Sir J. Gilbert, R.A., President of the Society of Painters in Water Colours; Mr. E. A. Bond (Principal Librarian, British Museum); Sir James Watson, of Glasgow, Mr. P. H. Calderon, R.A., and W. Calder Marshall, R.A. Among the members of the profession who were present were: Professors Donaldson and Lewis, Messrs. J. Whichcord, G. E. Street, A. Waterhouse, T. H. Wyatt, E. M. Barry, J. L. Pearson, J. O. Scott, W. H. White (sec.); C. Douglas, President of the Glasgow Institute of Architects; H. L. Florence, T. Worthington and H. Summers, Presidents of the London, Manchester, and Liverpool Architectural Associations; W. Millican, President of the Leicester Architectural Society, &c.

The toast of "The Health of the Queen" was proposed by the President, and drunk with enthusiasm.

In giving the next toast, "The Health of H.R.H. the Prince of Wales, patron of the Royal Institute of British Architects, the Princess of Wales, and the other members of the Royal Family," the President said that instead of leading a life of splendid leisure as he might have done, the Prince of Wales had chosen to occupy himself heartily, and with no stint of personal labour, in all movements which had for their object the advancement of the intellectual or material prosperity of his country. At the Paris Exposition it was now a matter of pride for this country, and worthy of congratulation to His Royal Highness, that the untiring and persistent personal exertions he made not only placed England in the foremost rank as regarded art, science, and commerce, but had much to do in inciting other nations to make the efforts which were needful to insure the splendid success which was obtained. By deeds like these, by readiness to mix with and assist his future subjects in objects which were all in all to them, but which could only claim his passing but kindly attention, his Royal Highness had gained for himself not only the loyalty, but the love of Englishmen all over the world. Since 1862, when the loss of the Prince Consort was a fresh and a deep sorrow to the nation, his Royal Highness, taking the place of his illustrious father, as patron of the Institute, had manifested the greatest interest in its welfare.

THE PRINCE OF WALES, who was received with

prolonged and hearty cheering, said:—The terms in which your president has been kind enough to give my health and the way in which you have received it deserve my most sincere and my most cordial thanks. I can assure you that it is with the greatest pleasure that I am here this evening and in your midst, not only as your guest, but in the position which I have the high honour to hold as patron of the Royal Institute of British Architects. As has been observed by your president, I acceded to this post after the death of my lamented father, who had held it from the year that I was born, and who was two years after that time present at a meeting of your institute, upon which occasion the father of your president, Sir Charles Barry, was present to receive him as vice-president. Your president has made some most flattering remarks about me—far too flattering, I fear. He has alluded especially to the late Paris Exhibition. It affords me great pleasure on this occasion—perhaps the first public occasion since that Exhibition was over that I have met a large assembly of my countrymen—to have the opportunity of expressing my thanks to that very large community which assisted me in those important labours during those two years, and especially during the one that has just passed. There were as many as eight gentlemen who composed the Royal Commission, not to speak of many others, some of whom are here this evening, who took different parts in the work which we had to do. It has been admitted that the Exhibition was a success, and we owe it to those gentlemen who assisted me in those labours, and to those great commercial, agricultural, and scientific bodies who spontaneously came forward to exhibit their goods and products, and who, with hardly any exception, responded to the call that was made upon them. The work that I did upon that occasion, gentlemen, was really but slight, and it was one both of love and of peace. Those who worked with me acted always in harmony with me, and I have to thank them again for having given up so much of their valuable time to go to Paris and assist in making the Exhibition the success which you have kindly said, through the mouth of your president, that it was. I must not forget one who is sitting at this table, to whom, I think, all of us are indebted more than to any other man—our indefatigable secretary, Sir Philip Cunliffe Owen. With regard to this Institute of British Architects, I may say that it was the unanimous opinion of an international jury that our architectural exhibits were better than those, or at any rate held very high rank, among those of all other nations. I thank you for the cordial reception you have given me, and also for the way in which you have drunk the health of the Princess of Wales, and the other members of my family.

Lieut.-General Sir D. LYSONS and Rear-Admiral the Hon. H. C. GLYN responded for "the Army, Navy, and Reserve Forces," which was proposed by Mr. J. Whichcord.

Mr. G. E. STREET, R.A., proposed the toast of the "Fine Arts," coupling with it the name of Sir Frederick Leighton. He was sure that painters and sculptors would excuse him for reminding his hearers of the fact that architecture was the mother of all the arts; not only did it afford a foundation for the sister arts, but it was essentially a public art, one in the enjoyment of which every passer-by could share, and in which everyone could take an equal interest with the patron, while the brush of the painter and the chisel of the sculptor were alike employed in the adornment of our public works. In the palmy days of art, the great painters could design cathedrals, and the best sculptors were also great architects. One would like to see that state of things revived, and he was not without hope that it would again be the case. In coupling with the toast, "The Health of the President of the Royal Academy," he would recall some of the incidents of his career. When one thought of four or five-and-twenty years ago, when Leighton's first great picture appeared, one could not but remember that the instinct of the painter was followed up by the instinct of the man who was so many-sided, and that he determined that the union of all the arts should be represented, and that the painter, the architect, and the sculptor should be depicted as carrying home a great work to be placed in a public building. But, Sir Frederick Leighton did not stop there. He had carried out some very noble work in a church in the New Forest,

and also in South Kensington Museum, and now he had in contemplation, and they all looked forward in eagerness for the work which the painter intended to add in decoration of that noble dome which soared above their great City of London. He furnished indeed in himself a notable example of that high degree of excellence which could be attained by a true artist in several branches of art.

Sir F. LEIGHTON, P.R.A., who was much cheered on rising to respond to the toast, expressed earnest hope that the consciousness of the necessity of a greater solidarity and a closer union between the sister arts which is awakening amongst us might continue to spread and increase to the infinite gain and strengthening of those arts. To this end all should work. They could do art no better service, provided only their efforts in that direction were accompanied by no vain illusions. The tendency of modern times was towards the sub-division and distribution of labour. That was the natural result of the widening and deepening of the field of knowledge, so that one single study sufficed to absorb, and even to overtax, the concentrated energy of the individual student, and that tendency had necessarily, and up to a certain point justifiably, been felt in art as well as in the other spheres of human activity. The problems of architecture, for example, were more complex than they used to be; and as it was impossible any longer to find men in whom all the knowable was concentrated, so it was, he was afraid, vain to hope for the return of those halcyon days in which painters built belfries, or sculptors cathedrals, and in which people were in doubt whether a Peruzzi should be called an architect or a painter, or a Rosellino, a sculptor or an architect. Nevertheless, that almost complete divorce between the arts which we frequently saw nowadays was not needed, was not justifiable, and was a reproach to us all; for, in spirit and in its inmost roots and recesses, all art was one. It was one soul speaking to us through various tongues—the same bright gem flashing its fire through various facets. In proportion, he believed, as artists bore that vital truth in mind, would be the dignity and the lasting value of their achievements and the influence and authority of the arts themselves.

The PRESIDENT proposed the "Healths of the Visitors," coupling with it the name of the Lord Chief Justice of England. In asking their guests to show in daily life towards members of the profession that consideration due to them, he would especially ask for that consideration and respect in courts of justice, where occasionally it seemed that architects as a class were judged by the actions of those who were unworthy of the profession.

Sir ALEXANDER COCKBURN said no one was a greater admirer of art than himself, but he appreciated architectural art and science above all, because it not only ministered to the comfort and happiness of mankind, but was inseparably associated with all the great epochs of our history, and all the great events of past times. Each important building brought back to recollection some historical incident on which we dwelt with interest, satisfaction, or pride. Where could we find anything greater, or anything that more ennobled the thoughts of man, and led him to rise to Heaven than our cathedral and church architecture? In Westminster Abbey reposed the ashes of great men who had passed away, while in connection with innumerable other of our church buildings were these great associations or historical recollections to which we should cling to the last. Only that day he had passed along that new building which was to be associated with the great profession to which he had the honour to belong, and looking up at it he was struck with the marvellous beauty of the nascent edifice. It would not be finished in his time—he ventured to think Westminster-hall would last long enough to outlast him—(cries of "No, no," and cheers)—and that it might be said of him that he was the last Chief Justice of England that administered the law in that ancient spot. Of that splendid edifice which was rising now, he said to himself that it would be associated hereafter with the great reign of Queen Victoria, and with that great change in the law under which common law and equity ceased to exist as separate branches of our judicial system. But, nevertheless, Westminster Hall would still retain its own glorious, transcendent associations to all time. It had witnessed the foundation of our liberties. That edifice might

be built over, altered, or modified, but it would never be effaced from the memory of Englishmen. In that hall had taken place some of the great trials which illustrated and ennobled English history. There treason had met its doom; there the victims of would-be tyranny and would-be judicial turpitude had triumphed over their persecutors; there his great predecessors, in whose shoes he sometimes almost trembled to stand, had administered justice through past ages down to recent times. Was he not right, therefore, in saying that architecture, which had built up these glorious structures, in which we triumphed, and which formed our exultation and our pride, was a science which could not be too highly appreciated, or too much admired? This institution stood at its head, fostering and encouraging this great and noble art. It stood upon the confines of art and science, combining both. It was an institution which every man must look to with admiration and honour, and to have been honoured by its princely hospitality was a thing to be remembered for the rest of one's life.

The PRINCE OF WALES said the task had been deputed to him of proposing the last, but by no means the least toast of the evening, that of "Prosperity to the Institute, and the Health of the President," with which he would couple the name of their President, Mr. Barry. He would thank him again for having invited him to that interesting banquet, and he would express the pleasure it had given him to dine there, as Mr. Barry's year of office would soon be over. I have to give you, gentlemen, his Royal Highness continued, the toast of Prosperity to your Institute. What greater proof of prosperity could there be than that when this society was founded, 40 years ago, you were only 20 in number, and now you number upwards of 750? When we look around us to-night and see gentlemen who have come from all parts of the United Kingdom, it shows at once the interest that is taken in this annual gathering. It must be a source of pleasure to you, and to all of us, to see among us one who has been for so many years connected with this Institute as Professor Donaldson. I allude to him as a veteran architect. He has lived to an advanced age, and I am sure it is the hope of all here present that he may long continue to grace this board at these annual gatherings with his presence. It would be useless for me to dilate on the position of this society. So much has been said this evening that if I were to dwell at any length upon the matters connected with the Institute I might be accused of what is vulgarly called "talking shop." I will, therefore, ask you, and those gentlemen especially who are here to-night as visitors, to drink most cordially the toast of "Prosperity to the Institute of British Architects," coupling with it the name of your President, Mr. Barry.

Mr. BARRY, in returning thanks, said that it was a matter of pride and congratulation that the little band of twenty members in 1834 had attained to the robust strength of 750, and it was a pleasure to see that the growth was still going on. The Institute was now approaching its 50th birthday, and might be deemed, therefore, to have reached years of discretion. It might have made mistakes in its youth, but he trusted the Institute was now settling down into a useful and honourable period of middle age. Personally, he congratulated himself upon the fact that, as his father had welcomed the late Prince Consort in the name of the Institute in 1841 and 1843, it was the high privilege of the eldest son of that father to welcome that evening the Prince Consort's eldest son.

In response to loud cries for "Donaldson," the Professor rose and briefly acknowledged the compliment that had been paid him, expressing the pleasure with which he witnessed the success of the Institute. They were much indebted to those who had held the office of president from the time when he had the honour of founding the Institute to the present time. He cordially thanked them for the manner in which they had received the mention of his name.

ANNUAL REPORT OF THE INSTITUTE.

THE Council of the Institute have issued to the members a report for the official year 1878-9 which is to be read at the annual meeting to be held on Monday next. The past twelve-month is spoken of as one of progress and

prosperity; the roll of membership shows increases in each class, the present number of subscribing members being 786 as against 709 in May, 1878. Since the commencement of the present session a change has been made in the keeping of the Institute accounts, the trust moneys having been separated from the ordinary funds. The ordinary income of the Institute for the year 1878, including arrears and excluding subscriptions paid in advance, amounted to £2,201 3s. 11d.; while the expenditure, including the outstanding accounts (£352 18s. 3d.) for the year 1878, amounted to £1,837 15s. 4d. Thus the ordinary income for the year exceeded the ordinary expenditure to the amount of £363 8s. 7d., and the state of the receipts about the beginning of the official year 1878-79 encouraged the council to devote £500 to the purchase of 3 per cent. consols as an addition to the invested capital of the Institute. Of the work effected during the year the foremost place is given in the report to the modifications and improvements made in the proposed by-laws of the Metropolitan Board of Works at the suggestion of the council. A report upon other alterations considered by the council to be desirable has been forwarded to the Home Office, but at present no definite decision has been arrived at the Home Secretary, and the by-laws are not yet promulgated. In reference to the Premises Improvement Scheme it is reported that Mr. Phipps's amended plans were found too expensive, and that the council will bring forward at the annual meeting next Monday a simple plan of rearrangement of the present premises, by which they will be rendered self-contained. A broad staircase and improved means of access, increased library accommodation, greater facilities for the transaction of business and more light and ventilation in the meeting room than now exist will be obtained. The meeting room thus altered will be made available to the members throughout the year for purposes of reading and writing; its re-adaptation to the necessities of the usual evening meetings, numbering about fifteen in the course of a session, will become a mere question of removing or adding benches. An official report on injury by and protection of buildings from lightning, embodying some thirty-six communications from members, has been prepared by Mr. John Whicheard and Professor Lewis, the Institute's representatives at the proposed Conference on Lightning Rods, and has been forwarded to Mr. Symonds, F.R.S., the secretary of the Conference. It is stated that the recommendation of the Marquis de Vogüé for the Royal Gold Medal has been approved by Her Majesty the Queen, and it is expected that M. de Vogüé will visit his country in June next in order to receive the medal. The Biennial Architectural Examination will be held on Monday week, the 12th inst., when ten candidate will be examined in the proficiency class, and nine in the preliminary class. The examiners for the year are Messrs. F. C. Penrose, G. Aitchison, and T. Roger Smith. An increase is reported in the number of readers at the library between the hours of 5 and 9 p.m. The collection has been increased during the year by the bequest of about 200 volumes by the late Mr. C. C. Nelson, and the presentation of 340 volumes (exclusive of periodicals and Transactions), and also 114 sheets of drawing and photographs. In conclusion, reference is made to the approaching retirement from the office of President of Mr. Charles Barry, and to the devotion, care, and energy with which he had discharged his duties. "By the position Mr. Barry has taken and maintained the Institute has," the report states, "been enabled to acquire a recognised standing such as it never before possessed, and the council are confident that the members must deeply appreciate the important services rendered by the President to themselves and to the profession of architects during his eventful years of office."

During the restoration of Sudbourne Church, East Suffolk, a wooden box was found last week concealed beneath the flooring of the north aisle, and in it were packed some 2,600 coins, chiefly silver pennies, in excellent preservation, of the reigns of Henry II. and Henry III., some being the productions of the Ipswich and Bury St. Edmund's mints. The style of the church is Early Perpendicular, and hence it is probable that the coins were concealed at the time of the original building of the church. The work of restoration is being carried out by Mr. H. S. Smith, builder, of Ipswich; Mr. Vincent, foreman.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

THE NEW CHURCH OF THE ORATORY.

WE have already published four designs submitted in competition for the above church, which included the design to which the second prize was awarded, and this week we are enabled to give to our readers a series of plates illustrating the selected design, "D. O. M." (to which the first prize was awarded), by Mr. Herbert A. Gribble, Baywater. It will be seen, on referring to the plan, that the one great object aimed at was simplicity of arrangement, but providing for no less than nine chapels, one altarino and baptistry, and twenty confessionals. It was the author's ambition to make the chapels as large as the site would permit, considering it indispensable to so numerous a community and congregation. The aisle chapels measure 30ft. square, and are connected together by openings sufficiently large for processional purposes. There is an ample supply of exterior doorways, and for the purpose of ingress the doors under each campanile will be used, while those at the bottom of nave are mainly intended for egress. The small door and staircase shown next the east transept are for the use of the choir, and lead to the organ chamber over Calvary Chapel, also to the cloak room, &c., in basement. And, again in the west transept provision is made for two corbetti having communications with the first and second floors of the priest's residence adjoining. The materials proposed to be used are—for the exterior, yellow brick and Portland stone dressings, and for the interior the large columns and pilasters will be in Devon red marble, with pedestals in grey ditto; the smaller columns will be executed in Genoa green, and the walls of such material as will lend itself for future decoration. The Sacristy is a very spacious apartment, measuring 53 x 30ft., well lighted by a continuous lantern carried on a groined cove supported by carya-

tides, and will be fitted up with walnut panelling and presses. A drawing of this room and other details we hope to give from time to time. The author appears to have indulged rather freely in many features peculiar to the School of Michael Angelo, Bononini, and Bernini, &c., but probably when he becomes more familiar with the Renaissance, he may give the preference to Palladio, or his faithful disciple Sir William Chambers. A coloured view of the interior is hung in the present Royal Academy Exhibition, at Burlington House.

PREMISES, COLESHILL-STREET, BIRMINGHAM.

THE above premises were designed for Messrs. Cooper and Co., to be erected on a site having a frontage to Colleshill-street and Old Cross-street. The ground-floor contains vaults, smoke-room, and the necessary offices, with kitchens, &c., in the basement. On the first-floor is a large club-room over vaults, with lift from basement, and lavatories, &c., attached; the third-floor being used for bedroom accommodation. The exterior to be executed in pressed bricks and red Mansfield stone, with terra-cotta ornamentation, moulded bricks being used for cornices, strings, &c. The internal fittings of vaults, smoke-room, &c., to be executed in American walnut. Messrs. F. and A. Wheeldon, of Birmingham and Wolverhampton, are the architects.

MAYO COLLEGE, AJMERE.

THE Mayo College at Ajmere, which is now being built, and which we illustrated on p. 198, was subscribed for some years ago by the native chiefs of Rajputana as a memorial to the late Lord Mayo, Governor-General. Several designs for the building were prepared by officers of the Public Works Department, and rejected as more or less unsuitable. Eventually the Government of India placed the design in the hands of Major Mant, R.E., now Architectural Executive Engineer and Surveyor to the Government of Bombay—an officer who is well-known in India as an architect, and as having made Indian architecture his special study. The college is intended for the education of the sons of the chiefs and nobles of Rajputana, and has already been open for some years in a building temporarily adapted for the purpose. The new building is designed in what may be termed the Hindu-Saracenic style—a fusion of the Hindu and Indian-Mahometan styles, which has already for the last two or three centuries been largely adopted by the Rajput chiefs, and even by well-to-do commoners in Rajputana and the North-West Provinces, for not only their temples and other public buildings, but for their palaces and dwellings also. The style selected harmonises, therefore, with local traditions, and is the most suitable that could be adopted, especially as it is thoroughly capable of adaptation to the exigencies of the climate and to all modern requirements. The college provides a large and handsome central lecture-hall (which will occasionally be used for durbars), library, office, and sitting-room for the principal, and class-room for fifty boys. It will be surrounded by detached boarding-houses, built at the cost of the various chiefs, each for the quota of pupils expected to be sent from his State. These boarding-houses have already been erected, and are more or less Oriental in style. The college will be built chiefly of sandstone; but marble of several colours, which is found in the vicinity, is also being freely used in its construction. The perspective we gave was drawn by Mr. Herbert Gribble from drawings sent home by Major Mant.

THE ART OF THE ITALIAN RENAISSANCE.

DR. TODHUNTER delivered the sixth of his course of lectures on this subject in the Museum Buildings, Trinity College, Dublin, on Saturday afternoon. There was a large attendance. The lecture was illustrated with a number of excellent photographs of the works of art referred to.

Dr. Todhunter said he was in that lecture to speak chiefly of Leonardo, Correggio, and Michael Angelo. So far they had watched the steady progress of Italian art from its rude beginnings in the works of Cimabue and Giotto to its technical perfection in the hands of Montegna, the Bellini, and the great Florentines. They had now to witness the last Titanic effort on the part of men of the most astounding genius

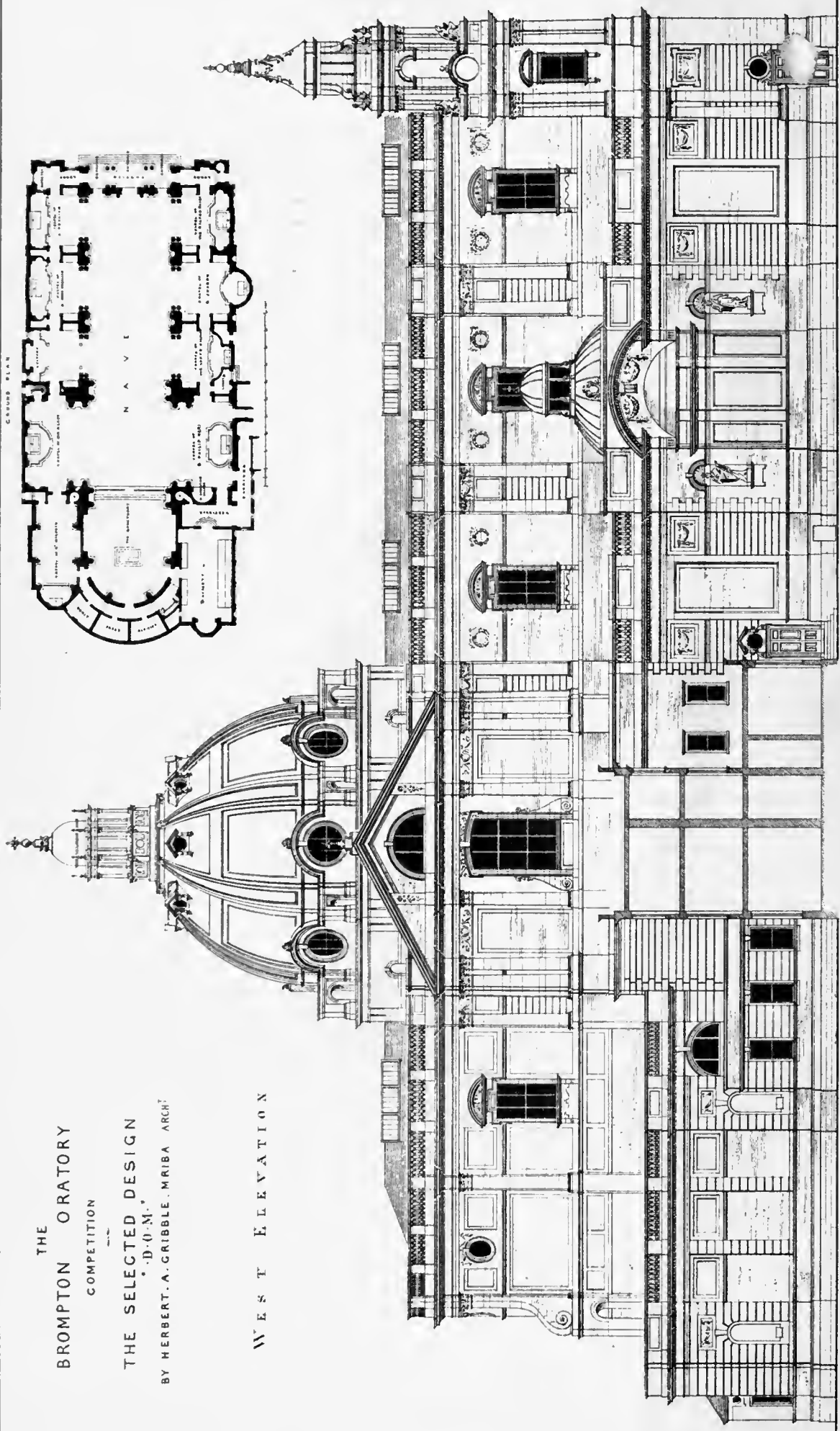
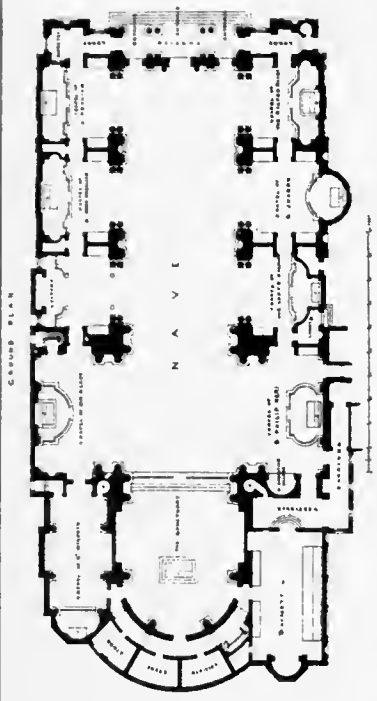
to carry the perfection further—to set a new story upon this Renaissance Tower of Babel, whose top was already in the clouds. In these three men, with the addition of Raphael and the Venetians, the spirit of the Renaissance attains its supreme expression. Leonardo, though in point of time a man of the 15th century, rather than of the 16th century, belongs to the latter by the reach of his genius and the perfection of his style. Chronologically, he is the contemporary of Sandro Botticelli and Filippino Lippi; logically, he belongs to the time of Michael Angelo and Raphael. Born in 1452, most of his work was done before the end of the 15th century, of which he saw only the first two decades, dying in 1519. The impression made by Leonardo upon his contemporaries is distinctly felt in the many anecdotes embalmed by Vasari and other writers of the day. He was for the Florentines and Milanese much what Dean Swift is for us in Dublin, a legendary personage around whose imposing personality quite a cycle of such anecdotes gathers. In personal appearance, as in genius, he was a king among princes—moving among men like a demi-god of physical grace and intellectual brightness. Great as was the versatility of many of the men of the Renaissance, Leonardo's was remarkable even compared with that of his most versatile contemporaries—the remarkable thing being the fact that if he was a jack-of-all-trades, he possessed the rare distinction of being master of all. Michael Angelo was great as an architect and sculptor, and a painter, and was no contemptible poet. Leonardo was besides a skilled musician, who sang his impromptu compositions to a silver lute of his own designing, formed like a horse's head, and tuned according to acoustic laws discovered by himself. He was an engineer of most original genius, the best anatomist of his day, a great arithmetician and geometer. There were few regions of human activity in which he was not more or less at home. But, probably few men of great genius so favoured by circumstances as Leonardo have left so little of supreme accomplishment as measured by the amount of actual power possessed. His very versatility, joined with an extreme fastidiousness as to his workmanship resulting from the high ideal he always set before him, prevented his perpetual activity from achieving the marvellous results which his marvellous genius served to warrant his admirers in expecting. He has also been unfortunate as regards the preservation of his greatest works. Nevertheless, enough of his work remains to confirm his title to a place among the greatest. Dr. Todhunter criticised in detail several of Leonardo's works, and then referred to Correggio. To turn from Leonardo to Correggio (he said) is almost like turning from Goethe to the most sensuous parts of Spenser; but Spenser is much too serious and thoughtful to be fitly compared with Correggio. The purposeless lusciousness of some of Schubert's beautiful and interminable compositions may, perhaps, serve as a tolerable parallel; but no one in any art was ever so innocently wanton, so divinely idiotic as Correggio. Correggio's drawings, which are usually sketches in red chalk, are often very beautiful, though the beauty is rather sensuous than spiritual, his type of female faces, with their narrow chins and heavy lidded eyes, verging upon the hysterical. Between Correggio and Michael Angelo there is a gulf as wide and deep as the Atlantic. They are inhabitants of different spiritual continents, or rather of different epochs of development. Correggio is like the sylph or sylvan spirit of the later mythologies. Michael Angelo is a Titan born of the primeval imagination of the world—an insurgent spirit, whose feet base themselves on the roots of the mountains, and whose brow o'ertops the clouds. The great work of Michael Angelo's youth is the "Pieta" of St. Peter's, finished when he was but four-and-twenty. It is indeed one of the great works of his life—full of the tenderest feeling. The Virgin Mother supports her dead son on her lap, across which he lies, with his nail-pierced hands and feet and thorn-crowned head hanging languidly in the utter rest of death. The mother gazes into his worn but peaceful face which seems to have fallen asleep with the words "It is finished" on his lips, as if she were pondering in her breast all that love brings to her remembrance. Her face is full of no vulgar anguish. A solemn awe seems to hold her in a trance, in which things deeper than life or death are revealed to her.

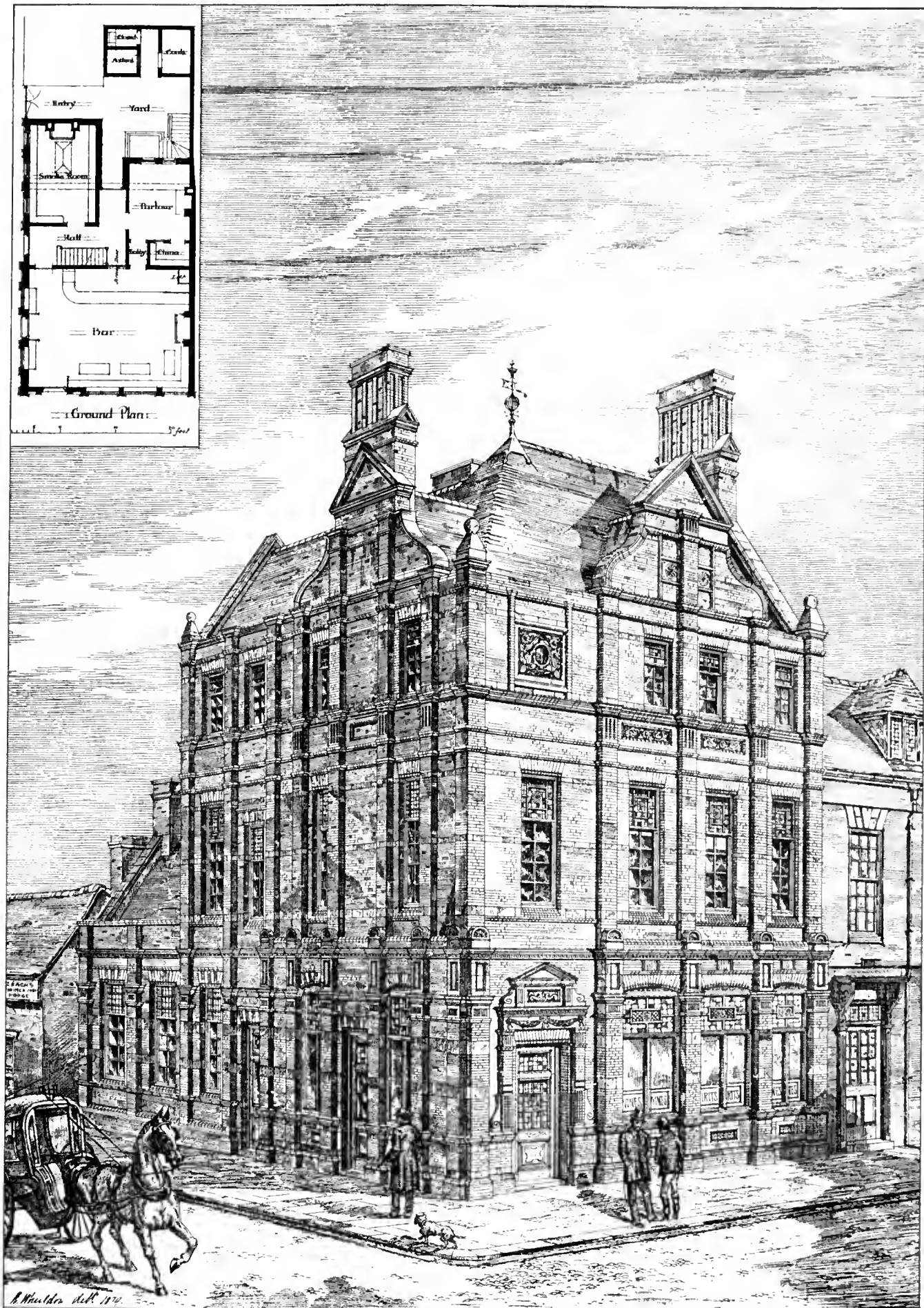
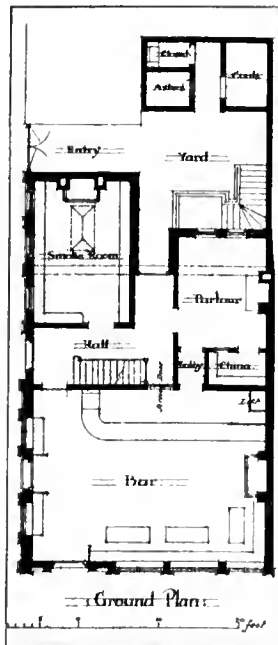
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THE
BROMPTON ORATORY
COMPETITION
THE SELECTED DESIGN
BY D.O.M.
BY HERBERT A. CRIBBLE, MRIBA ARCHT

WEST ELEVATION





Premises Colleshill St^h Birmingham for Mess^{rs} Cooper and C^o

and A. Wheeler Arch^ts Birmingham and Wolverhampton

Photo-lithographed & Printed by James Akerman, 5, Queen Square, W.C.



HISTORY AND ÆSTHETICS OF ARCHITECTURE.

At the Royal Institution, on Saturday afternoon, Mr. H. H. Statham delivered the first of a series of four lectures on "The Leading Styles of Architecture Historically and Æsthetically Considered." The lecture was of an elementary and non-professional character, and was illustrated by large diagrams and black board drawings, and by a series of small photolithographs, handed to each person on entering the lecture theatre, of similar character to those shown at a previous lecture in the same building, and which were reproduced in the *BUILDING NEWS* of Feb. 14th last (vide p. 170 ante). The relation to Nature of architecture as an art was pointed out, Mr. Statham insisting on the point that there should be no direct copy of natural objects either in design or decoration—all must be conventionalised. Many persons could more or less definitely pronounce on the style in which a building was erected, assigning a church to Gothic, a bank to Classic, or a club-house to Italian, while they had not considered the reasons for the selection of this dress nor how it was originated, and his aim was to show that all the "styles" employed in architecture were connected by a very long chain the one with the other, and that they grew out of varied requirements of climate, material, and habits of thought. If one opened any German work on architecture a large space would be found taken up with a learned disquisition on the origin of architecture, the inevitable conclusion arrived at by the author being that we know nothing about it. Inquirers come upon the earliest remains of the art in Egypt at a period when it was far advanced, and when the country was covered with immense temples, palaces, and other buildings, the records of a high state of civilisation. The typical Egyptian temple was described, the massive walls, the double ranges of internal columns, surrounding a series of courts, and the entrance between heavy pylons being adverted to. Lighting was effected by having an internal range of columns of greater height supporting the centre portion of the flat roof, an indirect light passing diagonally between the raised and lower portions of the roof into the temple. At Beni Hassan, at a temple erected presumably about 1800 B.C., the process by which the square posts supporting the roofs were rounded off into columns might be followed: here some of the posts had their angles canted off, while in others subsequently added to the temple a second paring of the unnecessary corners made the pillars sixteen-sided. In order that the angles might be seen in a side light, the surfaces between were slightly hollowed, and hence the origin of the fluted column. From Egyptian architecture the lecturer proceeded to that of Asia Minor, and showed illustrations of Lycian rock-cut tombs, in which the ornamentation was an evident reminiscence of timber construction. The directly wooden origin of the Doric style was discussed, the lecturer expressing the opinion that a case had not been made out by its supporters, one of many arguments against the theory being that the columns in the earliest temples of this order were the thickest, whereas if of wood a much more slender shaft would be sufficient to sustain the trabeate construction, and thus it was reasonable to infer that the columns would, as the art developed, have been gradually increased in bulk if the change from wood to stone were comparatively recent. On comparing a Greek Doric temple with an Egyptian one, a general resemblance could be detected; the grouping and the approaches were much the same, but the columns were now arranged outside the cella instead of within. A cushion or celtium was now placed below the abacus and between the column and the beam it carried, and to this a wooden origin might well be accorded. The progress of Greek architecture was rapidly sketched to the period of the building of the Parthenon, in which the highest refinement and grace met, and on which more intellectual force had been brought to bear than on any other building. The mode of lighting the interior of a Doric temple was not certainly known, the hypothetical theory propounded by Mr. Fergusson being the most generally adopted. It had been suggested to the lecturer that light was admitted through the thin slabs of marble alternating with the triglyphs above the architrave and known as metopes; these were about $\frac{3}{4}$ in. thick, and transmitted a certain amount of light. These

metopes illustrated an important law in architectural design that ornament should be applied only to features of no constructional importance; thus, these tiles having no weight to bear were decorated with sculpture. Amongst the errors made in the Parthenon was a range of bas reliefs running along the wall of the cella behind the architraves and in such a position that it could rarely be seen, and then only at a very sharp angle. The most interesting feature of Greek architecture was the elaborate system of optical refinements which were rediscovered by an English architect, Mr. F. C. Penrose, when measuring and drawing the Parthenon ruins. The Greek architects noticed that a straight line of any length would appear distorted to the observer especially if another of a different angle were placed in juxtaposition. In order to obviate the unsightliness that would thereby be occasioned, a minute and carefully calculated curve, based on the conic section, was given to every line throughout the Parthenon. The columns were not straight, but were convex and slightly diminished at the top; the lower member of the pediment, with its cornice, entablature, and architrave, was curved upwards, and the raking sides curved in a similar mode outwards, while even the pavement and steps followed the same curvature, which was continued upon all four sides, some extremely nice calculations being made as to the angles. The pilasters were diminished and inclined outwards, and to the echinus of the capitals of the columns the subtle hyperbolic form was given. This extreme refinement was only seen in the larger temples of the Periclean age, no such delicacy being observed in smaller buildings. To the absence of these optical adjustments was to be attributed the heavy and unsatisfactory character of modern buildings in Greek styles. The popular notion that Greek buildings were formally arranged in set lines was shown to be mistaken, the ground plan of the Acropolis with the various temples set at different angles being exhibited in disproof. In his next lecture Mr. Statham will deal with Roman architecture, including the Corinthian order, which he regards as essentially a Roman development.

CREOSOTING TIMBER.

WE have allowed Messrs. Armstrong, Addison, and Co., of Sunderland, to speak elsewhere for themselves as to the value of creosoting timber, as we did last week two other correspondents. For ourselves, we admit there has been creosoting and creosoting, but that when the process is performed properly upon seasoned wood, or after the withdrawal of the sap and moisture, and the oil is thoroughly injected into the pores, timber so prepared is practically imperishable, the experience of every practical engineer or architect proves. There is much in the manner of subjecting the wood; the moisture should first be thoroughly vapourised by heat, and the timber exposed to a steam pressure. The effect of creosote properly applied coagulates the albumen of the wood, and gives a waterproof coating to the fibre at the same time, thus arresting the absorption of moisture, for creosote oil is quite insoluble in water. Yellow pine should be made to absorb from 10 to 11lb. to the cubic foot, and from 8 to 10lb. is generally recommended for sleepers and ordinary purposes. Mr. Robert Walker, in the case reported which has given rise to this controversy, held that the process of creosoting by hermetically sealing the pores of the timber prevented the vaporisation of the sap; but it will be seen that the process of creosoting, if performed as we have indicated, practically insures the withdrawal of all sap. But timber is sometimes hollow or decayed at the core, and no process could be expected to impart strength to a pillar which, as Mr. Bridgeman, the coroner's surveyor, said, was hollow and reduced in substance, and which apparently yielded under an excessive load. The specimen of a creosoted Scotch fir sleeper referred to by Messrs. Armstrong, Addison and Co., is upon our table. It is thoroughly sound and hard to the impression of the finger nail, even at the heart, and still retains the strong smell of the creosote after a period of 27 years' service in a most trying position, while unpreserved sleepers of Scotch fir used in the Highland railways have had frequently to be renewed in periods varying from three to six years.

MESSRS. AUDSLEY'S "DICTIONARY OF ARCHITECTURE."

PARTS 5 and 6 of this Dictionary are upon our table, and we turn over the pages with fresh interest. The work has been brought down to the word "aqueduct," which completes the first volume. It is unnecessary to say more than we have already done in commendation of this Dictionary, except that it is far superior to any subsequent attempt in the same direction we have met with. Some interesting observations are made under the article "Apostles," to which we may refer at some length. It is remarked that in the earliest works of Christian art the apostles were invariably represented by certain simple emblems, the most common of which were twelve sheep, probably suggested by Our Lord's words, "I send you forth as sheep in the midst of wolves." The sheep are usually placed in groups of six on each side of a central figure of Christ represented as the Good Shepherd, or on each side of His early symbol, the lamb. In the more numerous instances the twelve sheep are arranged in two rows of six each placed on either side of and looking towards the Holy Lamb, represented standing on a small mount, from which four streams are flowing, and invested with the irradiated or inscribed nimbus. The twelve sheep are never invested with nimbi. At the extremities towers and gates are represented from which the sheep are supposed to have issued in procession towards the lamb. Examples of these compositions are to be found in the sculptures of sarcophagi, and in the decorations of the old churches of Rome, as in St. Clemente, St. Cecilia, St. Prassede, &c. The Apostles have also been figured, though more rarely, under the form of twelve doves; but as the authors remark, unless twelve doves are represented, it will be unwise to accept them as the emblems of the Apostles. In the primitive mode of representing them in human form they appear as twelve men accompanied by the emblematic sheep, but presenting no distinctive characters. In later works they are shown as aged men standing in a line or seated on thrones on either side of a figure of Christ, and each carrying in his hand a volume or scroll. Sometimes they are individualised by having their name inscribed near them. Messrs. Audsley refer to a "Guide to Painting," written by a Greek monk, of Mount Athos, named Pensilinos, as a work of some importance bearing upon this subject. See M. Didron's "Manual of Christian Iconography." Speaking of the order in which the Apostles should be represented, the authors say the Early or Mediæval artists did not settle any. Different arrangements have been adopted, but the Greek list given in the "Guide to Painting" is as follows:—St. Peter, St. Paul, St. John, St. Matthew, St. Luke, St. Mark, St. Andrew, St. Simon, St. James Major, St. Bartholomew, St. Thomas, and St. Philip. In Western arrangements the Apostles St. James Minor, St. Jude, and St. Matthias appear instead of St. Paul, St. Luke, and St. Mark. In Western Mediæval works which display Byzantine influence, as in the pulpit in the Cathedral of Troyes, the Greek order is met with. The Canon of the Mass is supposed to be the highest authority on the arrangement and order of the twelve apostles, according to the Latin Church. It is observed, "Except where their names are inscribed, it is a matter of difficulty to individualise the apostles in works of art executed prior to the beginning of the fourteenth century, but in the sculpture, glass and painting of the 14th and 15th centuries there is seldom any ambiguity." Long prior to the fourteenth century, emblems were given to SS. Peter and Paul. We may here give the emblems or attributes usually assigned to the Apostles in Mediæval art. St. Peter usually carries a pair of keys, the keys of heaven and hell, and a book, and sometimes a cross inverted. His lesser attributes are a church and a fish. St. Paul is generally represented bearing a sword and book. St. Andrew, the emblem of his martyrdom, a cross in the form of an X, more rarely a Latin cross, or one Y-shaped. St. James Major generally carries a pilgrim's staff and scrip or wallet, and with a scallop-shell attached to some portion of his garments; St. John (as an apostle) usually carries a cup in his hand, with a small serpent issuing from it; St. Thomas carries a builder's square, and sometimes a spear and dart, in allusion to his martyrdom; St. James Minor, a club or fuller's bat, also the instrument of his martyrdom; St.

Philip usually carries a cross, either of the Latin or Tau form, commonly placed on the top of a long staff. On several English rood-screens he is shown carrying a basket of bread, or with leaves in his hand. St. Bartholomew is depicted with the instrument of his painful death, a large knife; St. Matthew (as an apostle) has several emblems: the most common is a money-bag or box; sometimes he bears a poleaxe. St. Jude is depicted with a club, a halberd, a carpenter's square, a boat, an inverted cross, bread, and fishes. St. Simon has sometimes a fish or oar, or a saw, the instrument of his martyrdom; and St. Mathias has a halberd or axe, but occasionally a sword. The precious stones also mentioned in the Apocalypse were invested with symbolic meanings, and early applied to the Apostles. We may add that the article refers to the paintings on rood-screens where representations of the Apostles occur, the churches cited being those of Belagh, Irstead, Ringland, North Walsham, and Westwick, Norfolk; Carlisle Cathedral; Southwold Church, Suffolk; and East Wellow Church, Hampshire. The article on "Apse" is very comprehensive, and several illustrations are given, the works of Viollet-le-Duc, Rev. E. C. M. Walcott, Fergusson Texier, and Pullan being quoted.

STREET PAVEMENTS.

At the meeting of the Institution of Civil Engineers, on the 29th April, the first paper read was on "Street Carriageway Pavements," by Mr. George F. Deacon, M. Inst. C.E.

With respect to the figure of stone sets, the author explained that in order to secure stability their depth should be greater than any other dimension: but that the length should be greater than the width in order to facilitate breaking joint. His conclusions might be thus summarised:—Hard stone, in which joints were unnecessary for foothold.

	Depth.	Width.	Length.
	In. In.	Sets In. In.	Sets In. In.
Sets for moderate traffic	6 to 6½	4 to 14	5 to 7
Sets for heaviest traffic	7, 7½	4, 14	5, 7

Softer stones, in which joints were unnecessary for foothold.

	Depth.	Width.	Length.
	In. In.	Sets In. In.	Sets In. In.
Sets for light traffic or in lines	6 to 6½	3 to 14	5 to 7

A crucial examination of many classes of pavements had satisfied the author, in 1871, that those jointed with asphalt retained their figures better, and wore out less rapidly, than any others. This method of jointing, however, was often very indifferently performed. Since that date all the Liverpool pavements had been jointed in this manner with great advantage; and all those subject to heavy traffic had been constructed with Portland cement or bituminous concrete foundations. The mode of constructing the foundations and pavements differed in some important respects from that generally adopted, and was fully explained. The Portland cement concrete was mostly prepared in a yard, and not in the street where the work was going on; and the author had proved, by a large number of conclusive experiments, that no loss of strength, but probably a slight gain, arose from allowing such time as was occupied in cartage to elapse between mixing and placing *in situ*. Carriage-ways of bituminous concrete, or asphalt macadam, were next described. The smaller stones used for the upper layer of such pavements should not be much harder than the asphalt itself. A large area of this pavement had been constructed in Liverpool, and on sanitary grounds the system would probably be extended over many back streets.

After describing his experience of wood pavements in Liverpool, the author drew the conclusions that like stone pavements, they should be provided with concrete foundations, the joints should be very close, and the blocks should be creosoted.

Much difference of opinion existed as to the best mode of finishing or blinding the surface of macadamised pavements. Under a 15-ton steam roller, preceded by a watering-cart, 1,200 yards of trap-rock macadam, without blinding, could only be moderately consolidated by twenty-seven hours' continuous rolling. If blinded with trap-rock chippings from a stone breaker, the same area might be moderately consolidated by the same roller in eighteen hours. If

blinded with silicious gravel from ¾ inch to the size of a pin's head, mixed with about one-fourth part of macadam sweepings obtained in wet weather, the area might be thoroughly consolidated in nine hours. Macadam laid according to the last method wore better than that laid by the second, and that laid by the second much better than that laid by the first.

In order to compare the wear of different classes of pavements, the author had reduced the traffic to tons per annum per yard width of the carriageway, and in the following tables he compared the total annual cost of various pavements when subjected to a standard traffic.

Description of Pavement.	Original Cost per Square Yard at Present Prices.	Interest on Original Cost at 4½ per cent.	Sinking Fund Invested at 3 per cent. Compound Interest.	Maintenance per Square Yard per Annum.	Scavenging per Square Yard per Annum.	Gravelling per Square Yard per annum.	Total Annual Cost per Square Yard.	Remarks.
No. 1. Hard stone. Gravel joints. Hand-pitched foundation	s. d. 12 1	d. 6-5	d. 1-8	s. d. 0 1-0	d. 4-2	d. ..	s. d. 1 1-5	Old Liverpool pavements.
No. 2. Hard stone. Asphalt joints. Portland cement concrete foundation	15 1	8-2	0-6	0 0-25	2-4	..	0 11-45	Now constructed in Liverpool for heavy traffic.
No. 3. Hard stone. Asphalt joints. Bituminous concrete foundation	14 10	8-0	0-6	0 0-25	2-4	..	0 11-25	Ditto ditto.
No. 4. Medium stone. Asphalt joints. Portland cement concrete foundation	15 1	8-2	3-7	0 0-5	2-4	..	1 2-8	Ditto for light traffic, or steep gradients, and junctions of streets.
No. 5. Medium stone. Asphalt joints. Bituminous concrete foundation	14 10	8-0	3-7	0 0-5	2-4	..	1 2-6	Ditto ditto.
No. 6. Bituminous concrete	3 9	2-0	..	1 6-0	2-4	..	1 10-4	Ditto for back streets, and for street carriage-ways of very light traffic.
No. 7. Wood, creosoted. Bituminous concrete foundation	15 1-5	7-5	10-1	0 1-0	2-7	5-0	2 2-3	Prices if constructed by Corporation
No. 8. Macadam hand-pitched foundation ..	6 9	3-4	..	2 0-0	8-0	..	2 11-4	In Liverpool for suburban roads.

With a traffic of 40,000 tons per annum for every yard in width of carriageway, the figures for the last three pavements were as follow:—

Description of Pavement.	Original cost per Square Yard at present Prices.	Interest on original Cost at 4½ per cent.	Sinking Fund invested at 3 per cent. Compound Interest.	Maintenance per Square Yard per Annum.	Scavenging per Square Yard per Annum.	Gravelling per Square Yard per Annum.	Total Annual Cost per Square Yard.
No. 6. Bituminous concrete	s. d. 3 9	d. 2-0	d. ..	s. d. 0 9	d. 2-4	d. ..	s. d. 1 1-4
No. 7. Wood	15 1-5	7-5	4-3	0 10	2-7	5-0	1 8-5
No. 8. Macadam	6 9	3-4	..	1 0	8-0	..	1 11-4

From inquiries made with reference to the loads drawn by horses since the new Liverpool pavements were constructed, as compared with the loads drawn on the old pavements, and without giving credit for the great reduction of wear and tear of horses and vehicles, the author estimated that there was a saving in the cost of cartage alone exceeding £10,000 a year for every mile of such pavement as now laid in the Dock line of streets in Liverpool.

Of all pavements for street carriage-ways macadam appeared to the author to be the least satisfactory. It was the most costly, the dirtiest, and, on the average of all kinds of weather and all conditions of repair, probably involved a greater traction for a given load than any of the other systems when thoroughly well laid. Its dirtiness consisted not only in the excessive mud of wet weather, and the excessive and impure dust of dry weather, but also in the facility with which organic impurities were absorbed by it, decomposed within it, and exhaled to the atmosphere. In country roads this objection was insignificant, and no other pavement was better than well maintained macadam; but in some of the carriage-ways of the west end of London one would regard it as intolerable, had it not been tolerated so long. To the unsophisticated provincial the manner in which, on a hot July day, fashionable London rolled over her tainted macadam pavements, apparently without even

smelling them, was a mystery almost as great as surrounded the fact that the metropolis, alone among the great centres of civilisation in this country and in the world, still submitted with apparent satisfaction to an intermittent water supply, impure at times in almost every household, however pure the source of that supply might be, when with absolute pecuniary benefit a constant supply might be obtained.

The second paper was on "Wood as a Paving Material under Heavy Traffic," by Mr. O. H. Howarth, Assoc. Inst. C.E.

The primary point into which the conflicting

details of the street pavement problem could usually be resolved was simply this: That the conditions of road surface demanded by the two

main elements of street traffic, viz., the power and the load, were almost essentially opposed. That was, the surface most favourable to the intermittent tractive action of horses was not the one best adapted for the transmission of rolling load. To reconcile these conditions, so as to render them the least obstructive to each other, was the practical aim of road paving.

A series of observations, collected during the past three years, tended to show that against all the discrepancies which rendered comparisons of street traffic doubtful, opposite conditions had been found to arise by which they were compensated in the long run; and that, on the whole, the effect of such minor irregularities was largely controlled by the element of weight. Upon this consideration it became evident, that the formula of direct weight per unit of roadway width was that which must afford the least erroneous datum for reducing large series of traffic observations, taken under fixed rules respecting the conditions to be noted. The system adopted by the author aimed at obtaining reliable averages, by short and definite observations properly distributed, rather than from continuous counts over an isolated series of hours. The observations were collected by half-hours only, at fixed periods throughout the day of sixteen hours, from 7 A.M. to 11 P.M. in every case; such half-hours being respectively observed again on other days at the same points and in different con-

ditions of weather. The remaining night hours affording a traffic small in proportion, and at the same time subject to great irregularity with variable circumstances, were excluded, as vitiating the averages required. The system of short observations, while undoubtedly leading to a highly corrected comparative figure, was also found to facilitate the notes respecting weight, which were of necessity collected simultaneously with them. The traffic was divided under seven heads; for the most numerous and important of which the empty weights could be ascertained with precision, and the ordinary description of load estimated without any serious or cumulative error. These averages sufficed to show how widely the actual wear and tear upon any given roadway might be misconceived, in the light of a merely general or numerical estimate.

Experience afforded by recent trials pointed to the conclusion that the true theoretical condition under which wood should be used was that of a continuous and uninterrupted surface. If a whole street could be conceived to be paved with a single slab or section of fir timber, the surface well inlaid with clean grit or large sand, such road would (apart from expansive action) present, without comparison, the fairest test of the durable qualities of this material.

Upon the basis of these principles the system of paving with wood, known as Henson's, was introduced in 1875, having for its object the testing of the previous theory, that artificial structural foothold was indispensable to afford a fulcrum for tractive power, as well as to show the value of real continuity of surface, by providing the nearest possible approach to an uninterrupted area of wood only. The aim of the experiment was primarily to lay the blocks "heart to heart," upon a sound weight-bearing foundation, so as to present a continuous and uniform surface of wood on end. To such a construction the only foreseen obstacle was the variable expansion and contraction inseparable from that material under varying atmospheric conditions; and this, when accumulated over a large area, would doubtless have been of sufficient extent to become detrimental to the efficiency of a road pavement. With a view to meet this, it was borne in mind that the action of capillary expansion in wood was one which must be regarded as exercised slowly, through the minutest distances; but accumulated in proportion to the area of material subject to it. The compensation for such an expansion could therefore only be uniformly effected over a large area, by providing for the absorption of minute portions of it at the smallest possible intervals, establishing a series of minute compensations throughout the entire structure. The substance which was found in practice to be most available for this purpose was ordinary roofing-felt, from 1-16th to 1-8th inch thick, a strip of which, cut to the same width as the depth of the blocks, was interposed between each course, and thus formed a close and yet slightly elastic joint. In laying this pavement the system was adopted of driving up the blocks, as every eight or ten courses were laid, by heavy mallets and a plank laid along the face of the work, attention being given to the even range of the courses as this proceeded. The joint was thus closed as completely as possible, leaving only the actual fabric of the felt to take up the expansion, and by the mutual support of the blocks saving them from the rapidly destructive action of spreading at the edges. The protection of the wood was further enhanced by a layer of similar felt over the whole surface of the concrete foundation upon which the superstructure of wood was cushioned. Results tended to show that the several functions of this simple construction were correctly anticipated. The endurance of the wood, consequent upon its relief from vertical jarring and the mutual support of the edges of the blocks, was increased by probably not less than one-half or two-thirds. An even-grained well-grown deal, of medium weight and hardness, offered the best conditions, as far as experience went.

As regarded built roads, much was generally said upon the question of elasticity above alluded to; and it was one very commonly misapprehended. Distinction was not made between two widely different theories—viz.:—Was road-elasticity requisite as it affected the traffic, or was it desirable as concerned the road itself? Within limits, it was as advantageous to one as it was detrimental to the other. Elasticity of road was for the benefit of the traffic exclusively,

and not for that of the road; and the inference was that, if anywhere, it should be immediately at the surface, and there only. A totally inelastic road, whether absolutely smooth or designedly uneven, was open to objections, practically, on other grounds; and herein lay the chief characteristic which had brought wood into favour. Concurrently with a reasonable degree of durability, which admitted of being used to the utmost advantage, it presented always, and uniformly, a slight degree of surface elasticity, to the immeasurable saving of vehicles passing over it.

The standard of comparison, therefore, to which street pavements should be referred, must embody the two elements deducible from the preceding remarks—viz., the work performed (as represented by some systematic scale as suggested), and the sum total of direct expenditure upon it during a recognised unit of time. Of three materials—macadam, granite or porphyry sets, and asphalt—the first was beside the question, if only on the ground of its representing, under similar circumstances, a fixed charge of from 3s. to 6s. per superficial yard per annum. Granite was at the present time more nearly balanced with wood—excelling it somewhat in the matter of cheapness, but outweighed by it on the score of noise and injury to vehicles owing to its rigidity—the latter two defects insuperable, excepting at a cost which was but rarely bestowed upon it. Asphalt, labouring under an occasional deficiency insuperable at any cost—viz., absence of foothold—was nevertheless to be regarded favourably in point of cost, and would rank high so long as the definite solution of the problem of durability stood in abeyance. Meanwhile the above notable failing, together with the difficulty attending partial repairs, must detract from the value of the money-figure to be assigned to it.

In view, therefore, of the few materials at command, and of their several qualities and defects, the following questions comprise the chief issues to be decided:—

First.—Was the policy of paving for heavy traffic to aim at reduction of first cost and the retaining of certain alleged advantages attached to systems of continuous maintenance? or at the extinction of maintenance, and the acquisition of durability, combined with certain alleged disadvantages accompanying great resistance to wear?

Secondly.—Could a paved surface be made to fulfil the needs of tractive power by the intrinsic nature of any material, independently of designed mechanical form tending to obstruct free draught of load?

And lastly.—Could the durability of any description of wood, compatible with reasonable cost, be enhanced either in construction or in maintenance, so as to place it on a commercial rank with substances of greater resistance, but of less advantage in other respects?

PRINTING OR TRANSFERRING DESIGNS SUITABLE FOR WALL DECORATION.

A PROCESS for printing or transferring designs or representations upon woods, paper, and other surfaces has been recently patented in this country on behalf of L. Zweig and A. T. Tischler, of Vienna, and as it may possibly have some utility in the arts, we give a brief description:—In order to produce matrices or engravings for prints in an economical manner, it is proposed to employ peculiar metal positive prints of the designs to be copied, which are to be obtained by producing at first in low relief work the design to be copied on a zinc plate by etching the latter by galvanic action. For this purpose the zinc plate to be etched is covered with a body colour or coating in which the design to be transferred is traced by means of a tracer or graver, and the plate thus prepared is then used as a positive electrode in a galvanic decomposing cell. A second zinc plate, of the same size as the plate to be etched, and serving as the negative electrode, will be placed together with the positive plate, but at a proper distance from it in the decomposing cell. After the galvanic current has sufficiently operated upon the zinc plate which is placed in a solution of sulphate of zinc mixed with sulphuric acid, the etched plate is to be taken out of the decomposing cell, and washed in a bath of potash or soda lye, in order to remove the remainder of the body

colour. But the fact that all the engravings appear to be of the same depth is prejudicial to the clearness and sharpness of the transfer of the designs from a flexible printing plate or surface, produced by the aid of the etched plate, since besides the line raised parts, some parts also of the ground which are not intended for printing may be transferred or reproduced. To obviate this objection it is necessary to clean the zinc plate with a rag, to dry it off, and then to cover entirely all the low etched places with a mass or composition such as is used for printing-rollers, and composed chiefly of glue, glycerine, and syrup, by which operation the plate becomes perfectly even and plain. This is done for the purpose of preventing the tin from entering into the low etched places during the process of soldering. After this the widely veined parts must be more or less heightened with tin to the effect that they may appear deepened or recessed in the matrix, and that the blank or unveined places cannot be printed at once when the designs are transferred upon wood. The composition is then removed by putting the plate in warm water and the parts thereby dissolved are made even with a scraper. From the metal plate thus prepared, the printing matrices are obtained in the following manner:—The zinc plate is placed on the hollow bottom plate of a powerful press, which plate can be heated by steam and cooled by cold water. The composition to which the required softness is imparted by adding some solution of hygroscopic salt, such as chloride of calcium, chloride of zinc, or chloride of aluminium, is poured upon the oiled zinc plate, and the upper pressing plate, covered with a piece of linen of the same size as the zinc plate, is pressed down. The lower pressing plate, which must be perfectly plain and even, in order to enable the zinc plate to bed evenly and equally in all parts, is provided on its four sides with raised borders of the height of between 1-16th to 1-8th of an inch, by which the thickness of composition to be pressed upon the linen fabric will be regulated, the pressure of the upper pressing plate causing any surplus quantity to be squeezed out. During the time the upper pressing plate is being pressed down cold water is caused to flow through the bottom plate, whereby the setting or solidifying of the composition adhering to the linen fabric is much expedited. The linen, together with the composition firmly adhering thereto, and representing in relief the sunk parts in the zinc plate, discharges itself from the composition, and a matrix is thus obtained which is to be coated with a caoutchouc varnish, in order to render the matrix more resistible. The matrix is now ready for producing prints. The prints of relief designs will be made in the following way:—The matrix is passed over by inking-rollers coated with any desired colour, and is then gently pressed against the surface to be decorated, whether of wood, paper, or plastered wall surfaces, by means of a brush, and finally carefully removed from the surface. The designs now appear to be transferred on to the grounded or prepared surface; and for the purpose of fixing them nothing further is required than to varnish them as is done in hand-work.

THE "POOL OF BETHESDA," BY MR. EDWIN LONG, A.R.A.

A VERY impressive picture painted by Mr. Edwin Long, A.R.A., is now on view at the gallery of Mr. Arthur Lucas, 37, Duke-Street, Piccadilly. The subject chosen by Mr. Long, is the "Pool of Bethesda." It may be necessary to say that the picture is not a new one, that it was exhibited in the Royal Academy in 1876, but owing to the unfortunate position given to it on the walls seems to have been overlooked by the critics. No one who now sees it in the darkened room prepared for its reception at Mr. Lucas's gallery, under a light of discriminative value, can fail to remark that it possesses qualities which entitle it to rank with some of the foremost pictures of its class. In painting it, Mr. Long brought to his task a by no means common conception or mere literal rendering. He has spared no labour and study in making himself master of the surroundings and details of Eastern life in the time of our Saviour, and for this purpose visited the Holy Land in 1874-75 to examine the site of the ruins of Bethesda. The conception embodied in the picture is that particular season recorded in St. John v. when the angel descended to trouble the waters of the pool and to confer healing

power on it, the text taken being the second verse, "Now there is at Jerusalem by the sheep market, a pool which is called in the Hebrew tongue Bethesda, having five porches. In these lay a great multitude of impotent folk, of blind halt, withered, waiting for the moving of the water, &c." The central figure of the piece is a woman not of Jewish east, who sits in front of the pool, clasping to her breast a sick child whom she has brought to the healing waters. With pallid and dark complexion, her eyes uplifted in faith, tearful with a mother's emotion she is waiting anxiously for the angel to trouble the water. Her very hands seem to express the nervous anxiety with which she waits, and the bracelet round her wrist and the rotund arms are painted with remarkable realistic power. On her right side behind, crouches a dark old cripple eager for the first sign of movement of the pool, bent solely upon the material manifestation of signs, but whose face and beard are painted with life-like force. The artist has evidently attempted a contrast between these two prominent figures—the woman as typifying the Christian spirit, and the old cripple the Jewish Sadducean belief in "signs and wonders." He has, moreover, given a stirring picture of the spiritual meaning of the miracle portrayed. The other figures are accessory chiefly. On the left side of the Gentile woman, lies on his back an old man, while in the background through an open porch, are descending two others carrying a sick youth to the pool. In these also there is clearly a meaning conveyed that we cannot overlook. But the picture has an additional interest in the architectural background which represents one of the entrances or porches. The circular pillars are carefully delineated, and show a study of the best authorities, while upon one of the pillars we see hung several rows of straps, buckles, &c., or votive offerings symbolical of the infirmities cured. Upon this portion of the painting too much praise cannot be bestowed. It is not obtrusive in drawing or colour, the grey-coloured stonework of the pillars, the deepened shade of the gateway and the reflected lights, happily set off the figures and draperies, and these are subordinated to central figures, upon which a strong light is thrown. The pool itself, which occupies the extreme foreground, is transparent, and its reflections skilfully managed, while a white feather which floats lightly on its surface, helps to intensify the idea conveyed. We understand Mr. Long devoted much time to the water and its reflections, and actually modelled his figures and their draperies in order to obtain the true reflection. In composition and colouring the picture is a masterly performance without a painful sense of crowding; everything is subordinate to the dominant sentiment sought to be conveyed while the technique leaves nothing to be desired. We understand the picture is in the hands of the engraver and will shortly be reproduced.

COMPETITIONS.

IPSWICH POST-OFFICE.—It is satisfactory to note that the Town Council of Ipswich have decided to adopt the suggestion made in these columns a fortnight since, and will call in an architect to report upon the 22 plans received in competition for the new post-office and public offices.

RAMSGATE.—Mr. Abernethy, who was called in to advise on the plans of the proposed new road to connect the East and West Cliffs, delivered his report on Tuesday. He awarded the first premium to Mr. Cummings, of Tunbridge; the second to Mr. Higgins, of Victoria-street, Westminster; and the third to Mr. Trounson, of Penzance. The number of competitors was about seventy.

SCHOOLS OF ART.

NEWPORT.—A public meeting was held on Monday night to present the prizes for the past year to the students of the Newport (Mon.) School of Art. Mr. W. N. Johns read a short report for the session which closed last August. There were 70 students, being an increase of 22. The art day school was open 49 weeks, and was attended by six students. The number of drawings executed was 1,467, by 39 students. Nine passed in works, five in freehand, three in model, four in geometry, two in perspective, winning 23 certificates and two prizes. There were six in machine drawing, three in mathematics,

seven in acoustics, light, and heat; nine in magnetism and electricity; 20 certificates and five prizes. 1,552 works had been sent up for examination this year, and that accounted for the few drawings in the room.

Building Intelligence.

DERBY.—New beard-schools in Traffic-street were opened on Thursday, the 24th ult. These are the fourth erected by the Derby School Board, and have been erected from the designs of Messrs. Colthurst and Story, architects, Derby, which were selected in open competition. Accommodation is provided for 738 children. The boys' department comprises a principal school-room 54ft. by 22ft. by 20ft., and three class-rooms, each 23ft. by 20ft. by 15ft., the girls' department a principal schoolroom 48ft. by 22ft. by 20ft., and three class-rooms, each 22ft. by 20ft. by 15ft., and infants' department of similar size and arrangement to the girls. The infants are on the ground-floor, and the boys' and girls' on the first-floor, the space beneath the boys' room being formed into a covered playground. The rooms have double sashes, and are heated by hot-water. The style of the building is semi-Gothic, the outside is faced with best pressed red bricks with Stanton stone dressings and blue brick bands. The roofs are slated with Bangor slates and the ridges are finished with ornamental red cresting and terminals; on the centre of the main roof is a ventilating turret. The whole of the joiners' work is of selected pitch-pine, varnished. A boarded dado 4ft. high, with moulded capping, is carried round the whole of the rooms and corridors. Each yard is supplied with spacious latrines furnished with Macfarlane's patent iron fittings. The desks are on the dual principle, five rows deep, and were supplied by Messrs. Illingworth and Ingram, of Leeds. The contractor for the buildings was Mr. John Gilling, of London-road, Derby. The heating apparatus was supplied and fitted by Mr. T. Crump. Mr. R. Shepherd has acted as clerk of works. The total cost of the schools has been £6,700, including site £1,225, contract £4,300; and fittings, architect's commission, law costs, and extras, £1,275; the total cost being at the rate of £9 1s. 9d. per head.

ELY.—On Wednesday week St. Mary's Church, Ely, was reopened after restoration. The church has from time to time undergone repairs and alterations, but no great outlay was made for that purpose till 1829-30, when most of the stucco work and cement covering of the walls was done and pews and galleries erected. The first work recently undertaken was to examine the foundations, which for the most part were built upon the rock. These were found as sound as when first laid. The wall of the north aisle extending from the buttress at the east end of the base of the tower at the west end was in such a ruinous condition as to require rebuilding, the safety of the roof being dependent on this being done. The north porch bore evident traces of having been supported by external angle buttresses on each side of the entrance. These have not been rebuilt, but the windows which were bricked up have been reopened and glazed, and the old worn-out stone seats have been neatly re-topped with oak. On the side of the south aisle the stonework has been thoroughly repaired. The flank wall of the south chapel had to be entirely rebuilt, and a new external doorway has been inserted. The north clerestory wall has been repaired and relieved of its damp-looking coating of stucco. The nave roof was found in good condition; the roofs of the aisles were covered with lead, but so worn that the rafters were entirely decayed. The rafters had to be replaced, and the roofs are now covered with slate. The whole of the works have been carried out by Mr. Brown, builder, of Lynn, from the drawings and under the superintendence of Mr. Francy, of the firm of Messrs. Francy and Wood, architects, of Spring-gardens, London. The entire cost of the works amounts to £2,200.

HANWELL, MIDDLESEX.—The corner-stone of the new church, dedicated to St. Mark, was laid on the 25th ult., by Mr. Octavius Coope, M.P. for Middlesex. The first contract comprised the chancel, transepts, and first bay of the nave and aisles; since then the committee have been enabled to give orders for the

vestry and second bay of nave and aisles, and they trust before the works in hand are completed, sufficient funds will be forthcoming to complete remaining portions of the church, thus leaving only the tower and spire to a future period. The church is built of stock bricks, with stone and red brick dressings; the internal jambs and arches are red bricks, specially moulded with Pennant stone columns to nave and chancel. The roofs are of pitch-pine, plastered between rafters, covered with red tiles. The architect is Mr. Wm. White, F.S.A., of 30A, Wimpole-street, and the contractor of the whole of the works is Mr. Thomas Gregory, of Clapham-junction.

INCORPORATED CHURCH BUILDING SOCIETY.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its usual monthly meeting last week. Grants of money were made in aid of building new churches at Hulton View, Sambrosc, near Widnes, Lancashire, £200; Mottingham, in the parish of Eltham, Kent, £50; Sydenham St. Matthew, Kent, £150; Waen-fawr, in the parish of Llanbellig, near Carnarvon, £100; and Wigan St. Andrew, £300; rebuilding the churches at Hognaston, near Ashbourne, £70; Hopwas, near Tamworth, £90; Mansergh St. Peter, near Kirby Lonsdale, £60; and St. George, near Bristol, £200. Enlarging or otherwise improving the accommodation in churches at Broad Hinton, near Swindon, £30; Canterbury St. Dunstan, £40; Coldmore St. Michael, near Wallsall, £15; Cold Higham, near Towcester, £20; Cottingham St. Mary, near Rockingham, £20; Llangendcirne, near Kidwelly, £30; Pinhoe St. Michael, near Exeter, £20; and Prestbury St. Peter, near Macclesfield, £60. In consequence of the more extensive nature of the work, the grant of £170 formerly made towards building the church at Cambridge St. Barnabas was increased to £300. Grants were also made from the Special Mission Buildings Fund towards building mission churches at Axminster, Devon, £20; and Clayhanger, in the parish of Walsall Wood, Stafford, £30.

LANCASTER.—The town council have accepted the designs and tenders of Messrs. Handiside, for the erection of a new covered market. The building will cover an area of 154ft. by 150ft. The roof will consist of five bays, each 30ft. 6in. wide; these will be supported by 35 cast-iron columns, of an average height of 26ft. These will be placed longitudinally 25ft. apart, transversely 30ft. apart, connected by cast-iron framing.

LEICESTER.—On Wednesday week the memorial stone of the new chancel in course of erection at St. George's Church, Leicester, was laid. In connection with the new chancel there will be built an organ chamber, vestry, and chancel aisle. The chancel will be 32ft. long by 29ft. wide, the vestry 10ft. by 11ft., and the chancel aisle 20ft. by 12ft. The western gallery will be entirely removed, and seats for the choristers placed in the chancel. The altar will be elevated 4ft. 6in. above the nave floor, and immediately behind the former will be constructed an elaborate traceried seven-light eastern window 28ft. in height and 17ft. wide. The cost of the new chancel is estimated at about £3,500. Derby stone has been employed, and the appearance of the chancel, when erected, will harmonise with that of the church itself. The architect is Mr. A. W. Blomfield, Montague-square, London, and the work has been intrusted to Mr. Allen, Erskine-street, Leicester.

LICHFIELD.—The Dean and Chapter have issued an appeal for aid in filling in the 108 niches of the west front of Lichfield Cathedral, half of which is now in process of restoration. The work has been laid out in two sections, the north and the south. With the latter such progress has been made that its restoration already discloses the ultimate beauty of the whole façade. The Dean and Chapter estimate that each figure will cost £15, and whilst they will accept the choice of subscribers for a given statue, they reserve the right to select the sculptor and to regulate, for uniformity, other of the surrounding circumstances. At present the west window is surmounted by the figure of Charles II.; this will in future be occupied by a representation of our Saviour; whilst immediately beneath the niches will be filled with statues of the angels Raphael, Michael, and the Prophet Elijah. The line immediately beneath the parapet will include figures of Adam, Abel, Abraham, Isaac, Jacob, Seth, Enoch, Methuselah, Noah, Daniel,

Job, and Shem. The lines in the middle period (circa 1300 A.D., Bishop Langton) will include figures of Ezekiel, Hosea, Jonah, Zephaniah, the angel Michael, St. Stephen, Bishop de Chinton, Bishop Patteshull, Bishop Langton; the next line Daniel, Joel, Micah, Haggaai, the angel Raphael, St. Nicholas, Bishop Hacket, Bishop Lensdale, and Bishop Selwyn. The present figures will give place to St. Chad (which will occupy the centre position immediately above the west door), the figures to the north being in the following order:—Penda, Wulfere, Etheldred, Offa, Egbert, Ethelwolf, Ethelbert, Ethelred, Alfred, Edward the Elder, Canute, and Edward the Confessor. The lower line will include the statues of St. Paul, St. John, St. James, St. Simon, St. James the Less, St. Jude, and St. Matthias.

LITTLE SHELFORD, CAMBS.—The parish church of All Saints was reopened on Thursday, the 24th inst., after restoration from the designs of Mr. R. Reynolds Rowe, F.S.A., of Cambridge. The whole fabric has been underdrained, and one of Porritt's underground stoves has been fixed in the nave. The wretched work of 1760 in the chancel has been cleared away, and the sanctuary rebuilt; portions of stone coffins, and fragments of the earlier fabrics of 1080 and 1308, found in the walls, being worked upon so as to be exposed to view. The chancel is made to harmonise with the work of 1308, rather than with the additions of 1450. It is now entirely cased on the exterior with flints and pebbles, and the interior lined with Ancaster and Clunch ashlar work. The steps levelled by Will Downing in 1643 have been restored, new wood floors have been laid under the seats, and pavements of stone and tiles have been laid in other parts, those for the sanctuary being copies of the old figured ones found in the church. Old pews have been cleared away, the nave re-seated in oak, and the Jacobean pulpit cleansed, repaired, and set on a stone base. The walls of the nave have been repaired, made as upright as possible, and plastered inside. New roofs, copies in fac-simile of the best parts of the old ones, have been placed over the nave and chancel. They have cambered oak tie-beams and king posts; the ceilings are boarded and divided into panels with the old bratticing, ribs, and paterae; the roofs are recovered with the old tiles. The lower stages of the buttresses of the tower have been rebuilt. The south doorway has been renewed in moulded stone, a new oak door has been provided, and the whole protected by a porch of oak upon a stone plinth. It was intended to add a north aisle and to restore the tower, but at present these schemes have not been carried out for want of funds.

METROPOLITAN BOARD OF WORKS.—At this board on Friday, a letter was received from Sir H. A. Hunt, transmitting a copy of his final award in connection with the Great Wild-street Improvement Scheme, under the Artisans' Dwellings Act, 1875; it was referred to the Works Committee, to whom also was sent communications from the Home Office, transmitting copies of the provisional orders and plans relating to the Little Cornam-street, St. Giles and St. Pancras; West-street, Poplar, and Great Peter-street, Westminster, Improvement Schemes under the same Act. To the same committee was also forwarded a letter from the Home Office with reference to certain "Model Dwellings" now being built in Bethnal Green parish, which the local vestry fear will prove unhealthy, although they comply with the requirements of the Metropolitan Building Acts.

PRESTON BAGOT.—The parish church of Preston Bagot, near Henley-in-Arden, was reopened on Friday week by the Bishop of the Diocese. The restoration of the church has been carried out under the direction of Mr. J. A. Chatwin, of Birmingham. As the east end had to be taken down, by order of the diocesan surveyor, the architect took advantage of this, by extending the chancel a few yards, and erecting a chancel arch. The old east windows have been inserted in the new walls. In place of the red-brick chamber at the west end, for the bells, a turret, in character with the building has been erected. The old south porch was falling into decay, and has been replaced by a new open porch of English oak. Two small Norman lights in the north wall are to be filled with glass, by Messrs. Hardman. The work has been done by Messrs. Smallwood and Co., of Wootton Waven. The carving was executed by Mr. Roddis. Messrs. Jones and

Willis made the altar-cloth and dossal, and the lamps which are suspended from the roof.

TEDDINGTON.—The new cemetery was consecrated on the 9th of April. The whole plot of ground is nine acres, five and a half of which is laid out for present use, divided by a path 18ft. wide, one part consecrated and one part unconsecrated ground, all being laid out in flowing curves. The two chapels are of the Fourteenth Century Gothic, good in design, and connected by a carriage way over the central path and entrance arch flanked by towers, a vestry in each tower, surmounted by octagon crocketed spires; the chapels are each 30ft. by 20ft. inside, lined with white bricks and relief stamped Minton tiles. The material used for walling is Bargate ragstone, from Godalming, and Box Ground Bathstone for dressing. The contractors were Messrs. Harris and Borell, of Teddington. The carving, which is very satisfactory, is by Bide Szymanowicz, of Westminster, and the whole has been carried out from the designs and under the superintendence of Mr. T. Goodchild, architect, Adelphi, London.

THORPEBASSETT.—The parish church of Thorpebasset, in the East Riding of Yorkshire, which since July last has been undergoing a thorough restoration, was one of the type of plainness and solidity characteristic of the Early period of Norman architecture now fast disappearing. The edifice, though plain and unpretending, was full of interest, and we are glad to learn that its best features have been preserved in the present restoration, which was necessitated by the dilapidated condition of the building. The old piers and arches which were blocked up in the north wall have been opened out. A vestry has been added, separated from the north aisle and chancel by two arches, and spanned by a plain oak screen. The east and west walls retain their original character, but the higher elevation of the new roof has necessitated the reconstruction of the bell tower. The roof is now of one uniform level from east to west, and the main portion is covered with grey Westmoreland slates, the north aisle (the only one) being covered with lead. A new porch has also been added, of open woodwork, on a stone base; a much-needed protection to the fine old Norman doorway, which has survived many restorations of the church. All the windows in the north and south aisles are new. The architects are Messrs Paley and Austin, of Lancaster; and the contractor is Mr. Brown, of York. The church will be opened in June.

YARM.—The church of St. Mary Magdalene, Yarm, was reopened last week after restoration, under the direction of Messrs. Alexander and Henman, of Stockton-on-Tees. No structural alterations have been made in the building, but the interior has been thoroughly renovated; the floor has been raised and laid with wood blocks, and tiles in concrete and oak benches with covered ends now form the seating. The chancel, which before was very cramped, has been brought forward one bay into the nave, and divided from the south aisle by a carved oak screen, and on the other by the organ. Several new stained-glass windows have been inserted. New polished brass gasfittings have been supplied, and instead of the yellow wash, which formerly disfigured the walls, piers, and arches, decoration in colour has been carried out. The ceiling, formerly of plaster, is now in moulded and panelled pitch-pine. Messrs. Craggs and Benson, of Stockton, were the contractors for the bulk of the work. The total cost of the alterations amounted to about £2,500.

The Yorkshire Fine Art and Industrial Exhibition will be opened at York on Wednesday next, the 7th inst., by the Archbishop of York.

Four groups of statues in Caen stone have just been placed in St. Walburge's Roman Catholic church, Preston. The two are placed on the right and left of the high altar, and represent Adam and Eve after the fall, and Noah, the restorer, leaving the ark. The other statues represent Moses and Aaron, and are placed on either side of St. Joseph's altar. They are the work of the German sculptor, W. Pfyffer, and have been refurbished by Mr. Park, a local artistic decorator. In the centre of the high altar has been placed another statue, the Lamb of the Apocalypse, which had been carved from one piece of Caen stone, by Mr. Sherratt, of Preston. A stained glass window has been placed in the church by Lady Holland, in memory of her late husband. In the centre light is St. Henry, and on either side Saints Catherine and Cecilia.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Front Page Advertisements and Paragraph Advertisements is, per line. No front page or paragraph advertisement inserted for less than 5s.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—P. S. B.—H. W.—F. W. and Co.—M.—J. W. G.—B. S. B.—A. P. Co.—A. J.—A. W. R.—J. H.—T. H. C.—E. S. and Co.—W. T. and Sons.—C. of G.—F. J. B.—B.—F. W. and Co.—R. Bros.

J. P. HIGGINS. (The company which supplied the patent siliceous stone referred to was wound up some time since. We do not know who supplies it now. We should advise you to paint the verandah with the silicate paint made by the Silicate Paint Company, Charlton, Kent.)—R. B. HESLOP. (The same—simply different modes of spelling.)—OUR or TOWN. (Rivington's, Waterloo-place. Why not consult advertisement pages.)

"BUILDING NEWS" DESIGNING CLUB.

F. R. (We return the designs after our review is written.)—C. J. CALVERT. (The subjects will be announced in due course. We have noted your motto.)—B. C. (We, of course, intended the fire-place opening to be 3ft., but the treatment we leave to competitors. The misprint as to scale was corrected. It is a 1-6th of an inch scale.)

Correspondence.

HALIFAX SCHOOL BOARD COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—It having been stated in your columns that, acting upon Mr. Robson's report, the Board have decided to accept none of the plans sent in, it ought to be known in justice to the 93 competitors that Mr. Robson was only allowed to see a few of the designs submitted, chosen from the others by the Committee.

The fact that in those selected by the Committee none were worthy, in Mr. Robson's opinion, of being carried into execution, is a much greater reflection upon the wisdom of the Committee than upon the ability of the 93 architects who wasted their time in the competition.

If Mr. Robson had been allowed to inspect the whole of the designs none of the competitors could have complained.

In brief, the history of the whole affair is this:—

The Committee, whose duty it was to report upon the designs sent in, met, and with wonderful rapidity selected 7 designs out of the 93 (all the 7, by the way, being by local men). Of the 7, this remarkable Committee placed one of the designs first, one second, and one third. Then,

strange to say, all the sealed envelopes were opened, and everything made known before the monthly meeting of the Board, which was to endorse or otherwise the action of the Committee.

At the Board Meeting, the selection of the Committee was considered most unsatisfactory, and was not formally sanctioned. The full Board resolved itself into Committee, and selecting another set of 7 designs, called in Mr. Robson to report upon the 14.

How marvellous and intricate are the actions of committees!

Before Mr. Robson arrived at Halifax, the unfortunate 79 designs (none of which were to the Committee's thinking worthy a glance of Mr. Robson's eye) were returned to their still more unfortunate authors, many of whom were well up in Board School designs, and some of whose designs for this competition were much admired by authorities on School Board building perhaps as high as the Halifax Committee.—I am, &c.,
SET SQUARE.

WESLEYAN CHAPEL COMPETITION, SWINDON.

SIR,—I will not attempt to answer the pertinent question of your correspondent, "A Lover of Justice," but with your permission will give him a few additional particulars, which, as far as I can learn, are quite correct.

The committee, when reviewing the plans in a public journal, stated that they had selected some half-dozen from those sent in subject to the crucial test of an estimate, and if the first exceeded the stipulated sum they should take the second, and so on. The sequel, however, proves that after obtaining an estimate of the first, and finding it would cost nearly £5,000, they communicated with the author, who replied that he would guarantee it to be carried out within 10 per cent. of the stipulated sum. The committee met him, and the result was that tenders were publicly advertised for, the quantities being supplied to builders, and the highest estimate sent in for the works was £4,781 and the lowest £4,000. After several meetings of the committee, at which the said architect was present, they decided to accept his plans. About three months from the date the plans were first sent in the unsuccessful ones were returned, with a note stating the decision of the committee.—I am, &c.,
ONE OF THE UNSUCCESSFUL ONES.

BUILDING MACHINERY.

SIR,—We notice your article in the BUILDING NEWS of April 18th, "Notes on Building Construction Materials," and beg to say we have a revolving scoop, a tool corresponding, if not exactly, very nearly, to what you describe, and herewith inclose you list. The advantages of the use of this implement are not fully understood. For use in digging cellars and for the general purpose of removing earth expeditiously this implement is indispensable. If in making roads the plough and scraper were used together in breaking up and removing the soft top-soil, and then with the scraper the hard subsoil was formed into a slightly rounded carriage-way, a hard and firm foundation would be secured.

We find more difficulty to introduce scrapers into this country than anywhere else, and it seems a pity no trials or shows are held, from time to time, of building machinery; and we consider it would be to the interest of the building trade if you would develop the idea.—I am, &c.,
SELIG SONNENTHAL.

RAMSGATE PROPOSED NEW ROAD DESIGNS.

SIR,—I observe it is reported in your last number that the Ramsgate Improvement Commissioners have instructed Mr. Abernethy, C.E., to adjudicate on the respective merit of the competitive designs for the new road.

When first I heard that this gentleman was the person proposed to be selected I was much disappointed, as I am certain from his connection with the town on former occasions his judgment will not give such general satisfaction among competitors as that of an entire stranger. Since then I have heard my opinion confirmed by several competitors.

On reading Mr. Abernethy's letter, read at the last meeting of the Improvement Commissioners, I was more than ever convinced that his appointment will be most unsatisfactory. I will now

give the points of Mr. A.'s letter bearing out my statement. He says—

"I do not compete in designing. My son applied for plans and conditions simply to enable us to ascertain how the scheme might affect the question of extending the London, Chatham, and Dover Railway through the town, &c., &c. . . . a matter of great importance to the future prosperity of the town, and in which I am personally interested. . . . This project ought not to be lost sight of in connection with the new road, and it ought to be revived," &c., &c.

Now, is it not perfectly clear that the designs which fit in best with Mr. Abernethy's scheme of a railway extension will be successful ones, and the rest nowhere?

Is it likely that the best scheme of the lot—best for the town—best as an engineering work—best economically—and best for convenience—would stand a chance for first premium if it did not directly or indirectly favour—or rather if it happened to be antagonistic to Mr. Abernethy's railway scheme?

I will not trespass further on your space than to reiterate Mr. Abernethy's words referring to his railway scheme. He says it is "a matter in which I am personally interested, and which ought not to be lost sight of in connection with the new road." Now, how can a judge so situated give an unbiased judgment?—I am, &c.,
A COMPETITOR WHO PROTESTS.

THE CARLIOL TOWER, NEWCASTLE-UPON-TYNE.

SIR,—In the report given in your journal of the 25th inst., on the inquiry held by Mr. C. J. Smith with reference to the erection of a Central Free Library, statements are made by Mr. Oliver "in regard to his plan that it is only a clerical error," that "he got the position of the tower from one of the surveyors," and concerning "Mr. Fowler himself having made a mistake of some £10,000." These assertions being widely circulated through your journal, have a tendency to mislead the public if not corrected. I, therefore, have to state, with your kind permission, that the plans and drawings prepared by Mr. Oliver show on the north side a space behind the tower 20ft. in width, the actual width being only 10ft. 8in.; and upon this supposed 20ft. space Mr. Oliver shows a gallery of casts, art rooms, &c., which forms the only means of communication with the proposed building and the Mechanics' Institute. The remainder of the north boundary of the site Mr. Oliver shows 4ft. wider than available. The perspective is also incorrect. The new tower, instead of coming forward as shown, will scarcely be seen; and if carried out according to the ground plan will cut some feet into the old Weavers' Tower.

The drawings are drawn to scale, and have been exhibited in the public reading-room and art gallery here, placed in juxtaposition with my design.

Information has not been given by any of the Corporation surveyors, and the position of the tower is correctly shown on the large scale Ordnance Survey plans, therefore I am at a loss to know who "one of the surveyors" can mean.

I have not made a mistake in my estimate (which statement several members of Council and myself contradicted at the meeting); but, on the contrary, the stated amount of £20,000 I gave as the total cost of the scheme complete I consider to be a safe practical estimate, inasmuch as the lowest tender for the first contract for the shell of the building now on approval pending this inquiry amounts to £10,619 18s., and is under my estimate for this portion of the work. Other contracts will follow. To these must be added the purchase of the site of the tower, and belonging to the Corporation Estate (which must be allowed for), and the amount to be paid for the Mechanics' Institute, all of which items, showing how the £20,000 is made up, were handed to Mr. Smith. Mr. Oliver's assertion is, therefore, untrue. I will leave those best able to form an opinion as to whether or not such grave errors over a small strip of land made on plans and drawings for the purpose of soliciting public patronage can be considered clerical.—I am, &c.,
ALFRED M. FOWLER, M. Inst. C.E.,
Borough Engineer and Town Surveyor.

Borough Engineer and Town Surveyor's Office, Town Hall, Newcastle-upon-Tyne, 29th April.

CREOSOTED TIMBER.

SIR,—Will you kindly allow us to make a brief reference to the report of an inquest contained in your issue of the 18th inst.? To some extent your article on page 427 of the same paper is a reply to the extraordinary evidence of the district surveyor, whose statements we may say are in direct opposition to the experience and testimony of many of our most eminent engineers who have had ample opportunity of forming a correct judgment.

It does not appear to have occurred to the jury that the piece of timber in question might have been rotten at the heart when creosoted. Any person accustomed to cutting up timber knows that instances are constantly occurring of balks turning out rotten which before being cut had every appearance of being perfectly sound. It is rather amusing to be told that "the process of creosoting is a failure." We thought it had been pretty well established that when properly performed no process is so effectual, and none has so successfully stood the test under all kinds of circumstances which usually induce decay. We have known timber creosoted while quite wet—or rather we should say that the attempt has been made to creosote it—and we have also known it merely brushed over with creosote instead of being properly subjected to pressure under steam power. In either case the process would be almost useless.

Our experience as creosoters extends over twenty-six years, and such is our confidence in the thorough preservation of timber prepared by us that we have never hesitated to engage to replace at our own cost any wood that might be found to have decayed, provided that the surface, which contains the denser, and therefore the more valuable, portion of the preservative, had not been disturbed.

You have referred to the experience of Mr. Harrison, chief engineer to the North-Eastern Railway Company, relating to creosoted sleepers which had been in use for twenty years. More recently some Scotch fir sleepers have been taken up for examination from the same railway which have been in use for twenty-seven years, with a very heavy traffic over them, and they are still in a perfectly sound condition. Unpreserved Scotch fir sleepers have frequently to be renewed in three to six years. We send you a piece of one of these creosoted sleepers.

For tramway construction purposes some creosoted beech pavement has just been taken from the carriage-way of the bridge at Sunderland. This we supplied to the Corporation twelve years ago. It has been in constant use during this time, and is now perfectly sound, and practically as good as when first laid down. It would be difficult to find a more severe test of the value of a preservative. In its natural state scarcely any wood decays more rapidly than beech when exposed to wet and dry weather. Unpreserved, this pavement would not have lasted one-fourth of the time.

We will not trespass further on your space, but will be glad to furnish to any of your readers further information as to creosoting, and ample testimony as to its value.—We are, &c.,
ARMSTRONG, ADDISON, & Co.

North and South Docks, Sunderland,
and Northumberland Dock, near
North Shields.

The Hackney Board of Guardians have obtained the qualified approval of the Local Government Board to the erection of one of four proposed portions in connection with the scheme of extending the workhouse infirmary accommodation by building on the Castle-house estate. In returning the plans of Messrs. Lee and Smith, the architects to the Guardians, the Local Government Board recommend the area of window space in an infirmary should not be in greater proportion than a rate of 1 foot super to every 70 feet of cubic space in the ward; and intimate that windows should be arranged to be about 12 feet from centre to centre, and carried up to the ceiling, or to within 12 inches of the height of the ceiling, could probably be proportioned to meet this demand. The Board also require small wards containing three or four beds to be provided for special cases.

The spring exhibition of modern paintings has been opened at Southport. Amongst the water-colours are "At St. Peter's, Castello, Venice," by T. Hampson Jones; "Old Buildings at Newton, Shropshire," by William Eden; "Market Morning, Place St. Pierre, Lisieux," by Samuel J. Hodson, and "St. Hilda's Abbey, Whitby," by Walter Crane.

Intercommunication.

QUESTIONS.

[5751].—**Board School Plans.**—In submitting plans, &c., of board schools to the Education Department for their approval, is it necessary they should be accompanied by the specifications and bills of quantities? I am a novice in this matter, my present job being the first of the kind, and I should be thankful to receive from you an explanation of the requirements of the department relative thereto—viz., the deposit of plans. I have prepared a set of plans and specifications, and my board is pushing me to get them passed so that we may commence building, but I have not yet got out the quantities.—R. T.

[5752].—**Staining and Polishing Church Seats.**—I have a lot of deal church seating to do, and I want to give it a slight stain and a good dull polish. Will some one tell me how to do this, and the probable cost per yard? Super varnish is objected to as it makes it look so common.—V.

[5753].—**Abutments.**—Will one of your correspondents kindly work out in plain figures Spon's rule for the thickness of abutments—namely,

$$T = \sqrt{\frac{1}{2} L^2 + \frac{3}{2} B^2} + \left(\frac{W}{H} \right)^2 - \frac{W}{H}$$

Also the rules for struts and braces—namely,

$$D = \sqrt{L^2 + 2} \times 0.8.$$

—ALT BELCHER.

[5754].—**Drainage.**—I have been asked to prepare plans for the sewerage of a millage containing about 8,000 of a population, and would be glad if any of your experienced readers would kindly give me a few hints as to proportioning sizes of main, and branch pipes. The area of surface water drainage to be provided for, and how the varying gradients of drains enter into the calculations for determining the various sizes of the pipes? Also if there is any Act preventing the adjoining stream receiving the sewerage? Any hints on a small and suitable scheme will be much valued by me.—A LOCAL SURVEYOR.

[5755].—**House Details.**—I am having a house built, and most unfortunately my architect died, when some differences arose with the builder. Will some of your many readers give me their opinion on the following points. 1st. The outer walls are 2ft. 1in. thick, being 1ft. 6in. stone on the outside, 2in. cavity, and 4in. brick inside. Strips of lead are specified to be built in over all openings. What width ought they to be, and what is the proper mode of fixing? Show by sketch. 2nd. A "25-gallon copper" is specified for the washhouse. What is a copper? Is it made of iron or copper? The builder says the former and I the latter. Which is right?—VICIUM.

[5756].—**Black Colour on Stone.**—The stone we are using on a public works in the north is quarried from rock situated in the coal-measures and apparently contains iron. After being dressed and set it grows black in a few months. Can any one tell me how to take away this objectionable feature and restore the stone to the original light colour?—AN OLD RESTORER.

REPLIES.

[5759].—**Perspective.**—Draftsmen adopt their own methods as to heights. Some never think of taking any further trouble in the matter than arranging the heights by the eye. Of course, the proper method is to set them off on the edge of the picture plane, though I have generally fixed them at some convenient position at the side of my drawing, determinable, of course, by the width of interior. It is necessary in ordinary cases of drawing interior perspectives, to assume a station point beyond the interior, and if any size is to be given to the view this necessitates an enlargement.—G. H. G.

[5713].—**Wood Worms.**—Place the furniture in a closet or small room, and fumigate thoroughly with benzine. Chloroform has also been used with success, but benzine is more penetrative. The closet should be made airtight and the benzine renewed at intervals for a few days. Vapourisation has been found effective in many cases.—G. H. G.

[5715].—**Staybars v. Stained Glass.**—The queries raised by "Architect" are suggestive if not useful. I quite agree with him that the iron "staybars," or, as I have always called them, "saddle-bars," of old windows should not be disturbed, but that the stained glass should be made to suit them. Why should the architectural features of a building be destroyed or injured by painted glass? Is it not, indeed, preserving a proper relation between architecture and painted decoration to retain all structural expedients? Unfortunately, architects and stained-glass artists will continue to disagree upon this point, but I certainly could never understand the taking down of old ironwork to windows—perhaps extremely interesting specimens—to introduce, it may be, stained glass figure subjects, a proceeding not necessary if the glass artist at all cared for the ironwork. The plugging of the wire netting has injured and shaken the stone mullions and tracery of many fine windows, and I remember a case in Hampshire in which a fine perpendicular chancel window was taken out simply because it was found too old to bear the introduction of a memorial window without iron supports, and a new window—a miserable copy of the old one—was substituted. I certainly think this kind of tampering one which architects should resist, and that old windows had better be left alone or filled with geometrical designs rather than the ironwork should be interfered with.—G. H. G.

[5726].—**Rolled Joists.**—ERRATUM.—Last week's reply does not yet read correctly. It should read "W = breaking weight in tons on the centre."—H. A.

[5728].—**Coloured Building Stone.**—Has not Mr. Trickett fallen into the same error as "G. H. G.," and somewhat overdone the matter? It is not a long list of "names" we want, but some examples that our eyes may behold and see for ourselves and form our own opinions. For instance, the "Haul in Hand" is a good example in red; but what is it, and where does it come from? These

are the sort of questions to be answered. Apropos of red stone, I note in my peregrinations in and about town that some red stones bleach or lose their colour, and are afterwards paid over with a pigment of some kind which gives them a dirty chocolate brown colour, notably some large cantilevers at some red-brick mansions near Gloucester-road station; and then I note, also, that the Mansfield columns in the south facade of the Law Courts are of two shades, while those on the east front are much darker in colour than either. Can Mr. Trickett or any other correspondent explain this?—J. W.

[5741].—**Shop Front Work.**—I should advise "Constant Reader" to erect his building on the front girder before putting in the iron column, and allow the building to deflect, then fix the column in position, and wedge up. If he puts in the column first and builds above it, the building will deflect on each side (the column not deflecting same as brick or stone pillars on which the girder rests at each end) thereby causing the brickwork above to crack right up the centre. I have just carried out a similar case and all above the girder is quite perfect.—D.

[5742].—**Drainage.**—I think I can give "A. C." some information on the subject. A local authority is certainly not bound to bring a drain to the limit of an owner's premises, but the owner would pay for the expense of the drain and the connection of same with the sewer. By the Public Health Act (1875) it is not lawful to erect a house, or to occupy a house newly-erected or rebuilt, until a covered drain or drains be constructed of such size and materials, and at such level and with such fall, as on the report of the surveyor may appear to the urban authority to be necessary for the effectual drainage of such house; and the drain or drains so to be constructed shall empty into any sewer which the urban authority are entitled to use, and which is within 100ft. of some part of the site of the house.—W. G. LOWER.

[5745].—**Wood Roofs.**—In reply to "Nil Desperandum" a reliable formulae for the scantlings for timbers of wood roofs will give results bearing no evidence of uniform analogy with the sectional areas which, according to the known strength of timber in tension, would be equivalent to the strains due to the weight of roof and calculated by the parallelogram of forces. Iron tie rods of, say, 1 1/2 in. diameter, will usually be sufficient where a sectional area of 60 or 70 in. in timber would be used, while about 6 or 7 in. would be equal in tensile strength to the tie-rod. The necessity for so great difference in excess arises from several causes. First the timber may be reduced to about one-half in area for strength by some great knot. Then, again, there may be a diagonal shake running half way through, and which may not be readily visible until the weather has seasoned the truss when fixed. Again, the mortises and bolt holes will perhaps reduce to two-thirds the available sectional area. And thick snow, when saturated with water—say, 12 in. thick and weighing as it would, about 40 lb. to the cube foot, would perhaps quadruple the strain; and screwing or keying a truss will place it under a very great strain, because the tie-beam will be much cambered, but which is a mistake, because the shrinkage of the timber will not alter the distance between abutments; and with respect to the keys, if the tie beam shrinks the joint between the king-post and tie-beam will open in any case. And again, the tie-beam is frequently utilised to carry the ceiling and should be substantial to fix to. All the preceding considerations render it likely that wood tie-beams are not usually made much too large, when about ten times the area demanded by the strain of roof-covering and timbers, especially when we consider that the wind may add 20 or 30 cwt. more per square on the roof. Let us take the case of a principal rafter—say, 18 ft. long. Treat it as a post, and consider that its scantling must increase as the square of the length. We shall use the following formula:— $W = 20 \frac{B \times T^3}{L^2}$ where 20 is a constant. W = ten times the safe load and consequently equal to the breaking load taken in cwt.

B = breadth in inches.

T = thickness in inches.

L = length in feet.

Say we have a possible pressure of two tons, then we take $10 \times 2 = 20 = W$. $20 = 20 \times \frac{B \times T^3}{205}$. $205 = B \times T^3$.

Let T = 4 and $205 \div 64 = 3.2$, say, 4 1/4 in., and therefore scantling will be 4 1/4 in. \times 4 in., and add 4 in. \times 1 1/2 in. for notching, abutments, and mortises, and we shall obtain 6 in. \times 4 in., which is about what is usually adopted. The constant 20 on the second side of the equation represents the supposed number of cwt. which would crush an inch cube of fir, although some red fir would not crush with less than 40 to 45 cwt. an inch cube, but some white fir might not bear more than 17 or 18 cwt. on an inch cube. Straining beams can be calculated by the same method. An inspection of the formula will enable us to see that our unit for compressible timber is really a piece a foot long by 1 in. square. Tie-beams will require increasing or diminishing in direct ratio to their length. If the length doubles, the sectional area requires to be doubled. If the length is halved then the sectional area should also be halved. King and queen posts should follow the same rule, and so in proportion, having a tie-beam determined for one span, we can easily find one for any other span, and, as the large spans are the most important, it would be best to recollect the safe scantling for a tie-beam of, say, 60 ft. span, and obtain others as required. We might assume a scantling known by experience to be trustworthy for 60 ft. span—say, 12 in. \times 10 in. Having found the sectional area we can easily dispose or modify it to suit the other timbers as to convenience in framing truss. King posts and queen posts can be made half the sectional area of the tie-beam. Small queens half the sectional area of the large queens. Braces or struts may be calculated by making their sectional area equal to one fourth of the length of strut in inches. The preceding supposes the pitch to be about 30 degrees and the trusses about 10 ft. apart, but a much more depressed pitch would increase the strain in proportion on the principal timbers. When the tie-beam has to be scarfed the full sectional area must be retained by bolted and indented iron plates over joints and scarfs. Purlins are not affected by the span of roof but only by their distance apart and length between proper supports, and should be calculated by the same methods as beams or hinders to support joists except that they only need to support about 4 cwt. per foot super as a safe load, or 2 cwt. as the breaking load on each foot superficial of roof plane.—HENRY ASHMOSE.

[5745].—**Wood Roofs.**—In wooden roofs the scantlings are generally in excess of the resistance, and seldom require to be calculated like iron. Thus, for example, the compression in the principals and struts is generally more than safely resisted by the usual scantlings allowed to prevent sagging between points of support. To calculate the sizes for a certain strain, compressible or tensile, divide the strain in tons by the number of tons per square inch the material will safely bear, the quotient will give net sectional area in square inches.—G. H. G.

[5749].—**Quantities.**—"A. B. O." has certainly a claim for the quantities he prepared and which have been used to obtain tenders, but he ought not to have parted with a copy to his client, who clearly wished to save the 2 1/2 per cent. It is a very unusual way of acting.—G. H. G.

[5750].—**Litigation.**—Of course, if "A Young Architect" gave a certificate and a balance is due to builder, he can only support his decision, as the board are acting in defiance of their professional adviser. "A Y. A." asks if there are any instances where architects appear in court against their clients and in favour of the builder. I do not remember at the moment any; but justice in such an instance has to be considered, not precedent.—G. H. G.

WATER SUPPLY AND SANITARY MATTERS.

DORKING AND LEATHERHEAD.—A Local Government Board inquiry was held on Friday before Mr. Arnold Taylor into an application from the Dorking rural sanitary authority that a portion of the parish of Dorking and all or some portion of Leatherhead should be formed into a united district for carrying out a system of sewerage. It was stated that both the towns were in urgent need of drainage, and that the line of the river Mole passing through both was the only practicable course for a system depending upon gravitation. It appeared that at present no engineering advice or scheme could be submitted, and that it was not proposed to take in the sewage of the intermediate village of Mickleham. The inspector expressed an opinion that this village should be included in any scheme, and pointed out that before further action could be taken the portion of Leatherhead to be included in the district should be defined.

DORCHESTER.—The Town Council have accepted the tender of Messrs. Bull and Sons, for the iron-work for an elevated reservoir at the waterworks, for the sum of £1,395; also the same firm's tender for the brickwork, &c., at £1,171. The tender has also been accepted of the Coalbrookdale Company for the engine and pump, for the sum of £1,890. The works are to be carried out under the superintendence and from the designs of Mr. W. Norman, the Borough engineer and surveyor.

STATUES, MEMORIALS, &c.

MR. GLADSTONE.—**MANCHESTER.**—A life-size statue of Mr. Gladstone, lately executed by Mr. Theed, forming a companion statue to those of Mr. John Bright and Mr. Villiers, has just been placed in the Manchester Town Hall. It occupies what may be considered the post of honour—namely, the central niche in the public hall, between the principal entrance doors. The right hon. gentleman is represented as addressing an assembly. The attitude is perfectly characteristic, and the likeness is said to be excellent.

LEGAL INTELLIGENCE.

UNSTAMPED DRAWINGS.—At the Leyburn (Yorks.) County Court last week, before Mr. E. R. Turner, judge, Richard Crabtree, plumber and glazier, Huxton, sued the Huxton and Arrathorne School Board for £1 16s. 6d. for work done during the erection of a new school. Mr. Teale, Leyburn, appeared for the defendants. Mr. Palliser, architect, Northallerton, produced the plans and specification. His Honour found specification stamped, but plans not so, and as they were not attached, he ruled that the plans required a stamp as well as the specification. Plaintiff was unwilling to pay the penalty and have the plans stamped, and his Honour nonsuited him with costs.

Before commencing his sermon on Sunday morning, the Rector of Haworth (the Rev. J. Wade, M.A.) said, with reference to what had recently appeared with regard to the rebuilding of the church, that his duty in the parish was not to keep a show place for strangers, but a house of prayer. This he should endeavour to keep steadily in mind. He had received from the Rev. Mr. Nicholls, who was the husband, and, as far as he knew, the only living relative of Charlotte Brontë, his entire approval of what was proposed to be done. When the new church was completed, it would raise some splendid memorial to the memory of that gifted family.

A new drapery establishment in George-street and Cheapside, Luton, was opened last week. The premises include shops, and show and workrooms. The style of the building is Italian. Messrs. Brown and Humphries are the architects, Messrs. Rayment and Sons, of Hertford, the contractors, Mr. Bann, foreman.

Our Office Table.

A VERY melancholy result of wholesale poisoning by sewage gas was revealed at an inquest held at Chelsea, last week, touching the death of a child. It appeared that on the day the child died five other children of the family and the mother were also attacked with similar symptoms, three of whom succumbed, while the mother and daughter still remain in a critical state. The medical evidence showed that death was caused by sewage poisoning, the drains of the habitation being in a most neglected condition, and the jury returned a verdict to that effect, at the same time strongly censuring the owners of the property for not keeping the drains in better order.

PROFESSOR PEARSON presided on Saturday at the award of certificates to successful students at the Crystal Palace Company's School of Practical Engineering. The three first on the list of successful first-year students in the examination on steam were T. Cargill, H. A. Marshall, and M. Wilson. For the drawing office, R. Laing and M. Wilson were bracketed equal first. There were certificates for 14 in the pattern shops, and 14 in the fitting shops. The three first certificated members of the civil engineering section, second year, were—first term, W. Halfhide, A. A. Barnes, and W. N. Woods; second term, R. L. McLaren, R. E. M. Labarea and M. F. Wilson (equal); third term, T. E. P. Gardner and G. T. Ogilvie (equal). After the distribution of certificates, Professor Pearson expressed his pleasure at finding that the study of engineering was now being cultivated in undiminished schools in England. It was once remarked by one who was not an engineer that the engineering profession was one in which a man sometimes succeeded without education; and to this the educated engineer replied, "But you do not know the heavy costs which are paid for the blunders of the uneducated engineer." The English race, by reason of inherent energy of character, was a race well fitted for the work of engineering, and its sons had had to grasp some of the greatest problems of engineering. The history of engineering, however, showed that some men of the highest capacity in the profession, through the fault of being imperfectly trained by only being acquainted with one branch of their profession, had startled the world by great blunders, such as Bramah stating that the steam-engine would never become workable, and the elder Brunel that a steamship would never cross the Atlantic. No one could tell what was lost to the world by ten years' adherence on the part of a country to the mistaken views of such men, and the existence of a school like this was one of the safeguards which the world had against the dangers arising from the blunders of eminent men.

MR. E. M. BARRY, R.A., has submitted a report upon the best means of improving the accommodation in the House of Commons for reporting the debates. He proposes to alter the shape of the northern gallery of the Chamber by substituting a horse-shoe formation, and taking in a portion of the members' galleries to the right and left so far as the doors leading to the writing-rooms over the division lobbies. It is also proposed to make four rows of seats in front of the curve, with desks attached. Space for two of these rows, it is suggested, should be obtained by cutting away the partition at the back of the present gallery, and impinging upon the ante-rooms under the ladies' gallery. Professor Barry's report has been submitted to the Select Committee appointed to consider the subject of Parliamentary reporting.

THE Indian Government has instructed Mr. Guilford Lindsay Molesworth, M. Inst. C.E., the Director of Indian State Railways, to submit designs for a bridge across the Indus. Mr. Molesworth proposes to cross the main stream by a single span of 750ft., and in its construction he contemplates the use of steel only. The Indian Government considered that before committing itself to final acceptance of Mr. Molesworth's designs it would be most desirable that that gentleman should proceed to England and make himself fully acquainted with all the results of the most recent practice with steel, and with such details as to its manufacture and testing as should enable him to be able to specify with confidence the method in which the work should be carried out. His design of such a span as 750ft. is un-

doubtedly bold, and is not exceeded by any girder structure yet erected in any part of the world. The enterprise is a novel one, and will open the road to the future development of the use of this material, which, although as yet in its infancy in such forms of application, promises to be the material of the future. Its employment, owing to its light scantling, will render novel and special forms of construction necessary to guard against the tendency to buckle likely to manifest itself in such a great span as that of the proposed girder.

THE Board of Conservancy of the Thames have sent a return to the Local Government Board which will soon be in the printer's hands, and which will show that we are still drinking the sewage of Oxford. At present the Conservancy Board are pressing the authorities of the City and University of Oxford to cease from pouring their sewage into the drinking water of London, and the members indulge a hope that the filth of Oxford may in a short time be diverted from the river Thames. It is not long since Reading and Windsor added their sewage to the drinking water of the West End of London, not to mention some forty or fifty small towns and villages. Even when Oxford has ceased from polluting the Thames we shall have to endure contributions from the streams which contain the washings of the highly manured lands of the river basin, to say nothing of the incidents of traffic upon the stream above the intake of the water companies.

CLEOPATRA'S Needle is again encased in scaffolding, the Metropolitan Board of Works having, after a few months' deliberation, given assent to a scheme for coating it with a solution devised by the Indestructible Paint Company, in order to protect the stone from a London atmosphere and climate. The scaffolding has been erected by Messrs. John Mowlem and Co., the general contractors to the Board, who are at present also paving the landing-stage in front of the obelisk with granite. Some of the blocks are of unusually large dimensions, several measuring 11ft. 6in. by 5ft. When the scaffolding has been completed the obelisk will be cleansed with soap and water from the soot and impurities it has accumulated since its erection in September last, and the indestructible paint will then be applied under the personal supervision of Mr. Browning, manager to the company.

THE members of St. Paul's Ecclesiastical Society made their first architectural visit on Saturday under the direction of Mr. George H. Birch, A.R.I.B.A., who so arranged the excursion as to be illustrative of a paper on "Norman Architecture," read before the Society on the previous Wednesday. The members met at the Church of St. Bartholomew the Great, Smithfield, and were received by the rector and by Messrs. J. P. Seddon, F. T. Dollman, F. C. Penrose, H. Rounnie Gough, and A. R. Hoole, architects. Mr. Birch gave a short historical sketch of the foundation of the priory, of which the present church is a fragment, consisting of the choir, the great central lower arcade, and one bay of the Early English nave, and proceeded to point out the salient features of the Norman style—the massive columns with their severe bases and capitals, the mouldings of the arches and triforium, the vaulting of the aisles, and the remains of the apse. Regret was expressed that the restoration of this church has been for the present brought to a standstill. The members next visited the St. John's Chapel in the White Tower, and afterwards the crypt and cloisters, Westminster Abbey, Mr. Birch giving, in each instance, an architectural and historical lecture.

THE members' soirée of the Architectural Association was held at the Society's rooms on Friday evening last, when a very considerable number of the members were present. No programme had been prepared for the evening's entertainments, which were of the most simple and ordinary kind, including songs and recitations. The walls were hung with a collection of drawings and paintings by Colonel Fairman, noticed by us last week, and in the second gallery some water-colour sketches by members of the Association were arranged, as well as the drawings intended for reproduction in the proposed memorial work to the late Mr. Edmund Sharpe. Mr. Phené Spiers urged upon the members the duty of subscribing to this work, by which they would secure, not only a valuable

book for themselves, but assist in executing a simple duty incumbent upon them all as a body, finishing a work Mr. Sharpe had himself begun, and so erecting a slight memorial to their worthy leader, who had done so much for the welfare of the Association. If so good a proposal needs any recommendation we most thoroughly endorse it, and hope that several who are not members of the Association will send in their names as subscribers.

THE Council of the Society of Arts, having received an application from the City and Guilds of London Institute for the Advancement of Technical Education, offering to take charge of the Technological Examinations established by this society in 1873, and carried on up to the present time, have resolved to transfer these examinations to the charge of the institute. The Council have also ascertained that the Science and Art Department will assist the City Institute in conducting the examinations, in the same way as it has hitherto assisted the Society of Arts. The Technological Examinations for the present year will, therefore, be carried on under the direction of the institute, and all communications on the subject should be addressed to the Hon. Secretaries, City and Guilds of London Institute, Mercers' Hall, E.C.

THERE is nothing of an encouraging nature to report respecting the timber trade during the past week, which, like its predecessors for some time, has been one of extreme quietude. The importations have only been moderate, yet quite sufficient for the demand, and even more so. There have been a few cargoes of Norway battens landed at the North-Eastern ports, which have been sold at low prices, some as low as £4 10s. per standard c.i.f. The shipments from Sweden have not yet commenced to arrive, except by steamer from Gothenburg. The cargoes that have arrived during the past week consisted principally of mining timber and pit props, on consignment, and have been sold at low prices—round timber at 20s., and square at 18s. per load; 3in. props at 2s., 4in. at 3s., and 5in. at 4s. 6d. per 7½ft. c.i.f. The sawmills are very slack of work, and are running short time. Freights continue very low, with no signs of improvement.

CHIPS.

Arrangements have been completed for the erection of a new theatre in Glasgow at the corner of Sauchiehall and Renfield-streets, by a limited liability company, at a cost of £20,000. The theatre will be Franco-Italian in style, and will accommodate 2,000 persons. It will be 109ft. long, 56ft. wide, and 43ft. high, and will be provided with a balcony and gallery.

On Thursday in last week the Corporation of Waterford received and accepted a provisional order from the Local Government Board for Ireland enabling the Corporation to borrow £15,000 to complete the new water-works, on which £50,000 have already been expended. It was determined to proceed in the matter as quickly as possible.

A window on the south-side of Blewbury Church has been filled with stained glass. The subject is the Good Shepherd, and the work has been carried out by Messrs. Heaton, Butler & Bayne, of Garriek-street, W.C.

During the progress of building excavations opposite the ancient Castle at St. Andrew's, a subterranean passage 4ft. wide was found cut in the solid rock at a depth of 16ft. or 18ft. below the surface. It has been traced to an exit under the ward immediately on the south-east side of the castle gable. Of course it may prove to be a sewer, but tradition avers that an underground communication existed from the castle to the cathedral, or the residence of Mary Queen of Scots, at the east end of South-street. The passage is being further explored.

At a meeting of the Wymondham Burial Board on Wednesday week it was decided to build two mortuary chapels in the cemetery.

The Parish Church of Llandewi-Skirrid, in the diocese of Llandaff, is about to be re-built, with the exception of the tower, and enlarged. The work is being carried out at the cost of Mr. Crawshaw Bailey, and is estimated to amount to about £1,500.

Works of sewerage are about to be carried out at Cirencester, from the plans of Mr. Grantham, C.E. The estimated cost is £13,375.

A new parish clock on the restored tower of the church of Stratford St. Mary, Suffolk, was set in motion on Tuesday week. It has been manufactured by Messrs. Smith & Son, of St. John's Square, Clerkenwell, at a cost of £127, has two dials, and strikes the hours on the tenor bell.

A new saloon and assembly-room is being built on the West Cliff Slopes at Whitby at the sole expense of Sir George Elliott, M.P. It will be opened early in the season. The pleasure-grounds, terraces, roads, walks, and approaches are in process of formation. The architects are Mr. Julius Mayhew, of London, and Mr. E. H. Snales, of Whitby. The builder is Mr. John White, of Whitby.

A three-light stained-glass window and a memorial tablet have been placed in the Parish Church of St. Andrew, Borcham, Essex, in memory of the late Sir J. Tyssen Tyrell, Bart.

The death is announced of Mr. William Wright, builder and architect, of Great Yarmouth. The deceased, who was in his 70th year, was for twelve years a member of the Town Council of Yarmouth.

A general committee has been formed, consisting of members of the Somerset Archeological Society and of the Town Council, to arrange for the reception of the Royal Archeological Institute, which will visit the town in August. The Bishop of Bath and Wells has been appointed president for the year.

A limited liability company has been formed at Folkestone, with a capital of 4,000 shares of £1 each, for the purpose of providing a working man's club and institute in that town, the proposed buildings including a club-house for the use of friendly societies, a large concert and lecture-hall, baths, and lavatories. The eleven directors are all resident in the neighbourhood, and include a builder, a carpenter, a mason, a joiner, and a bricklayer. The architect to the company is Mr. Reginald Pope, of Folkestone.

An arrangement has been come to by the Parliamentary Committee of the Lancashire Corporation and the Directors of the Gas Company in that town for the purchase by the Corporation of the gasworks for the sum of £80,000, plus £7,000 for the redemption of mortgage bonds. The agreement remains to be confirmed by the whole council and the ratepayers.

At a recent meeting of the Cumberland and Westmoreland Archeological Society it was decided to have an excursion in June next from Penrith to Barton Church and other places in that vicinity.

The Archbishop of York, on Tuesday, reopened the church of St. Mary's, Birdsall, which has just been thoroughly restored and enlarged, at a cost of over £3,000, comprising the complete renovation of the nave of the church and the addition of a new stone chancel. A new reredos, of Bath stone, richly decorated, has also been inserted.

We have been asked from time to time to give lists of celebrated organs and the names of their designers. A very complete table of over a hundred examples, giving date of erection, name of architect or builder, and the style of decoration adopted, appears in this week's *ENGLISH MECHANIC AND WORLD OF SCIENCE*, compiled by Mr. J. Watson Warman, A.C.O., and may be found useful for reference by many readers.

A very large block of residential chambers is to be erected forthwith at Knightsbridge, adjoining Hyde-park, from the designs of Mr. Bentley, architect, of the Adelphi. The style is a sort of Queen Anne, very simply treated in brick. We can but remark how readily the leading Gothic architects forsake their style, for that against which they have so loudly protested.

An admirable portrait of Mr. J. R. Clayton (Clayton and Bell), by Mr. J. E. Hodgson, A.R.A.,

and a striking likeness of the late Mr. F. P. Cockerell, the architect, by Mr. G. F. Watts, R.A., are well hung at the Royal Academy this year.

Of all the quaint and curious frames to the pictures at the Royal Academy this year, that of the series of pictures illustrating Ahab's Coveting, by Mr. T. M. Rooke, is the most singular and elaborate. It is in a sort of Egyptian style, and quite the work of a painter.

The President and Fellows of St. John's College, Oxford, have accepted an estimate for the restoration of the front of the college, including a new hall and kitchen, upon the designs submitted by Mr. Gilbert Scott. The amount proposed to be expended is £10,000, and a beginning will be made at the commencement of the long vacation.

We are asked to state that the Annual Conversation given by the President of the Institution of Civil Engineers will this year be held on Monday, the 26th of May, in that portion of the South Kensington Museum which contains the engineering and naval models and machinery. Mr. Bateman, the president, in making this announcement at the last meeting, invited the members to lend for the occasion any suitable novelties, so that the already varied and extensive collection may be supplemented by examples of the latest developments of mechanical and engineering science.

The Portuguese animal-painter, Thomaz José Annunciação, died suddenly on the 3rd inst. at Lisbon. He was the director of the Academy of Fine Arts at Lisbon.

The Goldsmiths' Company has distributed £50, and the Fishmongers' Company 50 guineas toward a fund for establishing scholarships in the London Female School of Art.

A new Wesleyan chapel at Whitechurch, which has been erected at a cost of £6,000 from the plans of Mr. Rogers, of Preses, by Mr. Stringer, of Sandbach, was opened last week.

New schools are about to be commenced for St. Boniface's German church, Whitechapel, from plans drawn by Mr. John Young, architect. The cost of the building will be £1,600.

The foundation stone of a new mission chapel was laid at Wheatcroft, near Scarborough, last week. It will cost a little over £800. Its interior dimensions will be 79 feet by 20 feet 4 inches, and it is to accommodate about 240 persons.

The Roman Catholic church of St. Wilfrid, at Preston, is being gradually rebuilt from the designs of the Rev. L. Scholes, S.J., the son of an architect. The new aisle, or Lady chapel, will be opened on Sunday next, the 4th inst. It is of three bays, is Italian in style, and is constructed of brick, with terra cotta dressings. The benches are of pitch pine, with mahogany book boards. There are a baptistery, and four confessionals. At the end of the aisle, a flight of stone steps leads to an upper room or chapel, which will also form a tribune, looking into the proposed new nave.

The tender of Messrs. Thompson, of Peterborough, has been accepted for the restoration of the nave and chapter-house of the cathedral of Bangor, from the designs of the late Sir Gilbert Scott, R.A. The works were commenced yesterday (Thursday).

At a meeting of the Carlisle Diocesan Church Extension Society, held on the 17th April, the following grants were made in aid of church building:

Dearham, £73 6s. 8d. towards new aisle and transept; Thursley, £15; Crosscanonby, £50; Seberg-ham, £50; and Mansergh, £92.

Mr. Thos. Robinson, of Wycombe, died on Saturday week, aged 85. He had been a surveyor for the Reading and Hatfield turnpike road for 44 years, to which office he was originally appointed under Sir James Macadam.

A new Baptist tabernacle was opened at Henley-on-Thames, last week. Mr. Clements, of that town, was both architect and builder.

St. James's Church, Gloucester, is about to be enlarged from designs by Messrs. Waller and Sons, of the city. The church, which was built about 10 years ago, at present forms a parallelogram, 79 feet by 33 feet, placed north and south, and has no definite chancel. By adding an eastern aisle, 71 feet by 12 feet, the accommodation will be increased from 624 to 900 sittings, after re-seating the whole church. An extension will also be made on the south, so as to provide a chancel with organ, chamber, and choir aisle.

The restoration of Ehnore church is about to be commenced, the tender of Messrs. Gyde and Co., of Pitchcombe, having been accepted at £1,550, for the execution of the work. The architects are Messrs. Waller and Sons, of Gloucester. It is intended to place new roofs over the whole building as the existing ones are dilapidated and dangerous. The church will be refloored and rescaled, the walls, windows, bell framing, and plastering repaired, and gutter courses will be placed all round the building.

On Tuesday week the new church of St. Matthew, Littleport, was consecrated. The buildings and fittings have cost about £1,600. It is built with red and white brick, with Bath stone dressings, and will seat about 240 persons. The architect was Mr. W. Smith, 10, St. John's-street, Adelphi, London, and Mr. E. Brown, of Lynn, was the builder.

An address of congratulation from artists resident in Scarborough to Sir Frederick Leighton (who is a native of the town), on his appointment as President of the Royal Academy, is now completed, and will be presented in the course of a few days.

A bill forbidding the erection of chancel or rood screens in any place of worship of the Irish Church was on Tuesday, in the general synod, Dublin, thrown out upon the second reading.

A new school, erected by the School Board of London, was opened at Tanner's-hill, Deptford, on Friday. It is of the usual Queen Anne character.

Negotiations are in progress for the purchase of land at Sunningdale, Berks, for H.S.H. Count Gleichen, upon which it is proposed to build a new residence from the designs of Mr. David Brandon, F.S.A.

The Lowestoft Improvement Commissioners have resolved to call in Mr. Peter Bruff, C.E., of Ipswich, to examine and report the best means of protecting the sewage outlet on the beach.

Mr. Boehm, A.R.A., has completed the model of the monument to be erected in the Mausoleum, at Windsor, in memory of the late Princess Alice. The monument itself will be completed in ten months.

At Nottingham police-court on Tuesday, a charge of obtaining £50 by means of false pretences brought against John Sontheran, joiner and builder of that town, which has been gone into on five or six occasions, was dismissed.

Roofing Felts.—F. Braby & Co.

INODOROUS, SARKING, SHEATHING, AND HAIR FELTS KEPT ALWAYS IN STOCK. MANUFACTURERS OF PERFORATED ZINC, PERFORATED COPPER, AND PERFORATED IRON IN VARIOUS DESIGNS AND GAUGES.

Wrought Iron Tanks.—F. Braby & Co.

PAINTED AND GALVANISED, OF IMPROVED MANUFACTURE

Corrugated Iron.—F. Braby & Co.

GALVANISED AND BLACK IN ALL GAUGES, KEPT IN STOCK. ZINC WORK OF ALL KINDS.

FITZROY WORKS, 356 TO 369, EUSTON ROAD, LONDON.
HATTON GARDEN, LIVERPOOL. GREAT CLYDE STREET, GLASGOW. AND AT CYPRUS.

The members of the Cheltenham Fine Art Society on Tuesday week presented Mr. Sidney Herbert, artist, of Carlton Lodge, Cheltenham, with a Sevres tea-service and a purse of gold, as an acknowledgment of his services to the society, and to the cause of art in Cheltenham.

A memorial baptistry is about to be erected at St. John the Baptist's Church, Bathwick, in the angle between the tower and the north-west portion of the church, the space between the baptistry and nave being arcaded and filled with light iron grilles. The plans have been prepared by Mr. A. W. Blomfield, M.A., under whose superintendence extensive additions were made to the church in 1870.

At Caerphilly, on Friday, the members of the Twyn Welsh Calvinistic Methodist chapel met to consider plans for the rebuilding of the chapel on the present site. According to a local daily journal, "a very pretty Gothic design was fixed upon, with a Gothic tower entrance," but the newspaper does not deem it necessary to acquaint its readers with the name of the fortunate author of this very pretty design.

A new Catholic convent is about to be built in Lillie-road, Fulham, from the designs of Messrs. Goldie and Child.

Various works of improvement are about to be carried out at the Church-in-the-Grove, Sydenham, under the superintendence of Mr. J. Toller.

A line of pneumatic tubes is being laid down Fleet-street and across Ludgate-circus, for a service of pneumatic dispatches between the General Post-office, St. Martin's-le-Grand, and the branch offices in Ludgate-circus and Chancery-lane. The work is being carried out under contract by Messrs. Reid Brothers, Mr. Dilks foreman.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Society of Engineers. Paper by Edward D. Barker on "Hydraulic Continuous, and Automatic Brakes," 7.30 p.m.
Society of Arts. "Recent Advances in Telegraphy," by W. H. Preece. Lecture, No. 3.

Royal Institute of British Architects. Annual general meeting for election of officers, &c., 8 p.m.

WEDNESDAY.—Society of Arts. Paper by Lloyd Wise on "The Government Patent Bill," 8 p.m.

THURSDAY.—Society of Arts. Lecture No. 1, by W. H. Perkin, on "The History of Alizarine and Allied Colouring Matters and their Production from Coal Tar," 8 p.m.

Society for the Fine Arts. Lecture by T. H. Wright on "The Music of the Harps, and National Airs of Ireland and Scotland," 8 p.m.

FRIDAY.—Architectural Association. Paper by J. Weale, "Notes on the Measurement of Old Buildings, having Special Reference to St. Alban's Abbey," 7.30 p.m.

Royal Institution. Sir John Lubbock on "The Habits of Ants," 9 p.m.

SATURDAY.—Royal Institution. H. H. Statham on "The Leading Styles of Architecture Historically and Aesthetically Considered," No. 3. 3 p.m.

HELLIWELL'S Patented NEW SYSTEM

IMPERISHABLE GLAZING WITHOUT PUTTY. All Woodwork is covered, and no outside painting is required. Old Roofs Re-glazed. Any one can repair or take in pieces.

See half-page Advt. in next Number.

T. W. HELLIWELL, Brighouse, Yorkshire;
or, 19, Parliament-street, London.—[ADVT.]

Holloway's Pills.—Colds, Catarrhs, and other febrile affections can be readily arrested in their early stages by these Pills. If taken according to their accompanying directions, in addition to their cooling and purifying properties, these Pills control the circulation, reduce febrile symptoms, relax the skin, promote perspiration and restore health.

Trade News.

WAGES MOVEMENT.

AYR.—As the result of a conference between masters and men, it has been agreed that the masons' wages be reduced ½d. per hour. The masters at first proposed 1d.

BARNSELY.—Yesterday the whole of the masons and labourers employed by various firms in Barnsley struck work against an extension of hours and a lower rate of wages. The masters gave three months' notice, which expired yesterday. They demand half an hour more work per day, and payment by the hour instead of the day. The men have offered to accept a reduction of 3s. weekly, and to work by the day, but they decline to work longer hours.

BLACKBURN.—The employés in the building trades in Blackburn, including bricksetters, masons, slaters, plumbers, and joiners, have had notice given them that their wages will be reduced 1d. per hour. No change is to be made in the number of hours.

CARDIFF.—At a meeting of carpenters and joiners held on Saturday, to consider the proposals made by the master builders at the recent conference, a resolution was passed expressing the men's opinion that the exigencies of the building trade in Cardiff are not so pressing as to call on them to accept a reduction. This was ordered to be forwarded to the Master Builders' Association.—The plasterers of Cardiff have voluntarily offered to accept a reduction of ½d. an hour in their wages, which they consider called for by the state of trade.

LEEDS.—The impending strikes in the Leeds building trade have been averted, the masons and labourers accepting a reduction of a halfpenny per hour.—The cabinet makers of Leeds had been on strike a week against a proposed reduction of 5 per cent. on the union scale of wages. On Monday they resumed work, conceding the demand of the masters.

LIVERPOOL.—A general reduction in wages and longer hours by the Liverpool building trade operatives, excepting the plasterers, has been accepted. They, however, object to start work at six o'clock in the morning. Forty-eight hours have been given them to reconsider their decision: failing that, a strike will ensue.—On Thursday night, at an aggregate meeting of the joiners of Liverpool, it was agreed to accept a reduction of ½d. per hour. The masters' original proposal was a reduction of 1d. per hour, which was met by an offer from the men to accept ½d., and the dispute has been settled by the compromise indicated above.

NORTHAMPTON.—Four hundred men engaged in the building trade at Northampton struck work on Saturday against a reduction of a halfpenny per hour in wages.

Douling Freestone and Ham Hill Stone of best quality. Prices, delivered at any part of the United Kingdom, given on application to

CHARLES TRASK,

Norton-sub-Hamdon, Ilminster, Somerset.

Agent: Mr. E. CRICKMAY, 4, Agar-street, London, W.C.—[ADVT.]

TENDERS.

BENGOE.—For laying additional water mains at Bengoe, for the Hertford Rural Sanitary Authority. Messrs. Smith and Austin, Hertford, hydraulic engineers. Quantities supplied:—

Hudson, C.	£115 0 0
Raymont, J., and Son	105 0 0
Gairr, R. (accepted)	93 6 0

BERKHAMPTSTEAD.—For the erection of play shed, upper and fives' courts, boundary walls, corrugated iron fence, and terrace paving, for the governors of the Berkhamstead Grammar School. Mr. C. P. Painter, engineer and surveyor:—

Osborn	£1,016 5 0	without ground work.
Monk	921 17 6	" "
Fincher and Smith	918 0 0	" "
Cook (accepted)	922 0 0	including ground work.

BOSTON.—For the execution of engineer's work in connection with the baths about to be built by the Corporation:—

Tuxford and Sons, Boston (accepted)	£405 13 6
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[Twenty-five tenders received, the highest being £1,850 and the lowest £355.]

BOSTON.—For the erection of the new baths about to be built for the Corporation:—

Lucas, John (accepted)	£2,557 10 0
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BRENTWOOD.—For the supply of iron pipes, for the Shenfield and South Weald Special Drainage District, Essex:—

Henderson, Gracechurch-street, E.C. (accepted)	£490 0 0
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CIRENCESTER.—For gasfittings in new board schools. Mr. Tripp, architect to the Cirencester School Board:—

Lane, W.	£73 10 0
Tovey, J. and H.	55 0 6
Alexander and Thompson	44 15 0
Gillman and Son (accepted)	37 2 6

[Architect's estimate £45.]

CROYDON.—For commercial school and residence, Oakfield-road, for Mr. Thos. Lerrey. Mr. T. Brookes, architect. Quantities by Messrs. R. L. Curtis and Son:—

Mutch, W.	£2,350 0 0
Jarrett, C.	2,200 0 0
Saker, J.	2,200 0 0
Coles, C.	2,267 0 0
Legg, H.	2,249 0 0
Taylor, M.	2,195 0 0

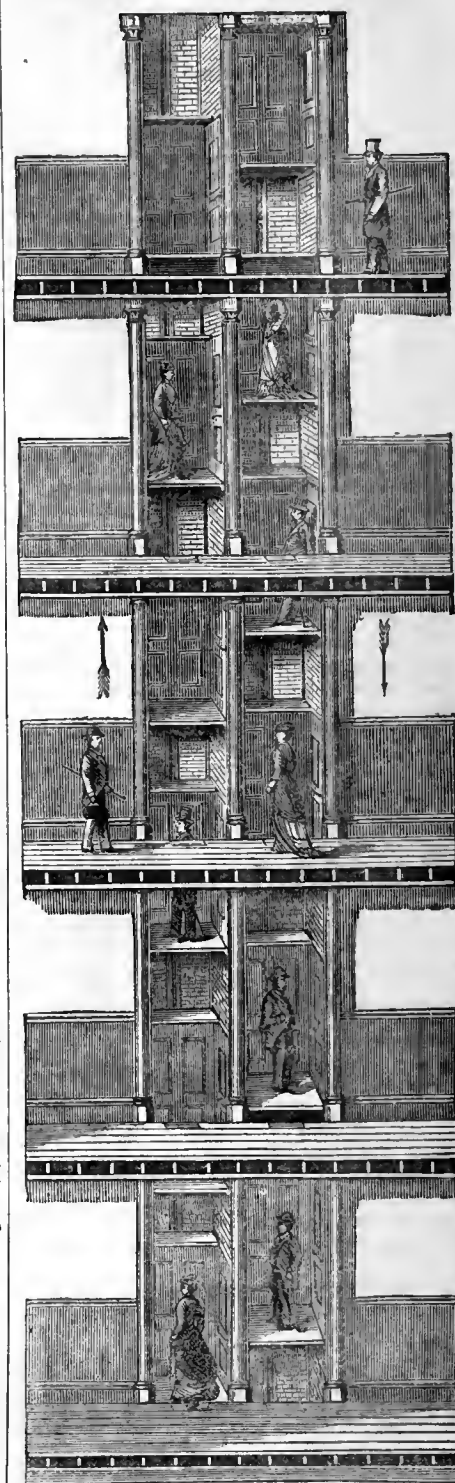
DEPTFORD.—For the erection of lodges, stables, and disinfecting and destroying apparatus on the premises of the Greenwich District Board of Works, at Knott-street, Deptford:—

Mace (accepted)	£2,640 13 0
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HODDERSDON.—For laying additional sewers at Hodderson, for the Ware Rural Sanitary Authority. Messrs. Smith and Austin, Hertford, sanitary engineers. Quantities supplied:—

Nicholls, J. W.	£160 13 0
Taint, J. A.	160 0 0
Gray, W.	152 0 0
Strachan and Co.	150 0 0
Rowley, T.	140 0 0

HART'S PATENT CYCLIC ELEVATOR.



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PATENTEE, 37, WALBROOK, E.C.
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SOLE MAKERS:
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Engineers, Millwrights, Founders,
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DARTFORD, KENT,
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UNIVERSAL CRUSHER.

THE BUILDING NEWS.

LONDON, FRIDAY, MAY 9, 1879.

THE PICTURES AT THE ROYAL ACADEMY.

THE 111th Exhibition of the Royal Academy will bear a favourable comparison with most of those which have preceded it, though we miss some old friends, and have to regret the falling off of a few artists who once were thought to be deserving of high honours. The President shows no less than eight pictures, the most important, No. 188, being the fine representation of "Elijah in the Wilderness," which was deservedly so much admired in the Paris Exhibition. The prophet has sunk to sleep overborne by his anxiety and toil. As he tosses about restlessly on the hard rock, the angel who has brought him food watches over him with kind compassion. The drawing of the principal figure is admirable. No. 119, "Biondina," a study of a fair, blue-eyed girl dressed in a blue bodice over white linen, trimmed with red bows. There are other similar portraits of equal merit, the most important, and in some respects most pleasing, of which is "Amarilla," No. 289. The lovely girl stands facing the spectator under a trellis covered with vine, the dark blue of the distant Mediterranean at the back harmonising with the quiet stillness suggested by the scene. Mr. Millais has surpassed himself; a finer portrait than that of Mr. Gladstone (No. 214) has seldom adorned the walls of the Academy. In strength and portrayal of character it reminds one of the best works of Moroni—but its manner of treatment and handling is all original. No one, as far as we know, has ever produced such perfect effect with so little apparent labour. You seem to see the man himself—every line, every hair, every characteristic of mind and feature.* No. 274, a portrait of a lady, is also a masterly production, but hardly so successful, except in the magic representation of the various textures of the dress, as the above. The flesh seems powdery and untruly coloured—a defect which time will probably increase. In No. 150 we have a new and bold exhibition of the artist's varied powers, "The tower of strength which stood, Four-square to all the winds that blew." A rough old square-built tower, now a ruin, stands on a jutland, surrounded on three sides by a rough, chopping sea. The sky, stormy and lurid, suggests the sort of tempests the sturdy old building has had to bear for a thousand years or so. We see little to admire in the works of C. W. Cope. No. 232 is a weak and stagey scene from "Hamlet," where poor Ophelia offers to return his costly presents which he pretended not to have given her. The colour is all unnatural, the drawing tame and devoid of character or feeling; nothing looks real about it. The very architecture is as unlike anything that was ever done, as Alma Tadema's is always true to the most minute detail. The picture of Solomon Hart, and those of Charles Landseer, though, by right of the painters being Academicians, occupying valuable space upon the line, do not call for criticism. It is a pity, when many deserving works are of necessity rejected on account of the large number of paintings now sent in, that something cannot be done at least to prevent such things being placed in important positions. Mr. Orchardson again gives us a dramatic incident of eighteenth-century life. No. 287, his only picture, is named "Hard Hit." The subject is commonplace enough, but under the masterly hand of the artist escapes tameness.

* This portrait is, we are glad to learn, to be engraved by Mr. T. Oldham Barlow, R.A.

In a handsomely-furnished room, as will happen where play is high in all countries, three clever rogues, though in garb of the best society, have got the better of a younger dupe, who is leaving the room after having dropped his money. How hard and long they have been at the game is shown by the heaps of cards which bestrew the floor of the apartment. We are reminded of Greville's account of what took place at Outlands. Everything is strictly in keeping. The smooth polish of the host rising to bid his unlucky guest, "Good morning," as he stands about to open the door; he being too much occupied with his ill-luck to return the civility or notice the chair which he overthrew as he rose from the table; the sinister, inquiring look of the host's opposite partner, and the cunning pretence of concern in the old stager who is shuffling the cards, are excellently described. The handling altogether is very slight, almost to a fault.

T. Faed also exhibits but one painting, No. 207. It is in his best manner, and the subject is joyous and happy. Free from care, a handsome young peasant woman is seated beside her baby, who is lying asleep under an improvised canopy to keep off the hot sun. All among the flowers, some of which she is making up, together with some bright red berries, to delight her little one when he awakes. All is sunshine and brightness. J. R. Herbert again gives a scene in Palestine. Young St. John Baptist is seated in a desert place, apart from the haunts of man, studying from a parchment scroll. His mode of living is shown by a partly-eaten honeycomb and two or three locusts at his side. A good deal of pains has been taken in painting the hot barren waste, but the effect of the whole is not successful. Altogether better, as a religious picture, is Mr. E. Armitage's fine and scholarly painting of the "Woman taken in Adultery." The story is singularly well told. The woman stands in agony of shame and terror, while the chief accuser is vehemently urging the enormity of her offence, unheeding the words which the Saviour is tracing upon the dust at His feet. Not so the other zealots at the right hand of the picture: they begin to see what is being written, and can scarcely believe their eyes. The contrast of character seems symbolised in the great and strong contrast of colour.

In No. 261, Chester Loomis sends a good, though somewhat tamely-treated attempt to revivify incidents of Mediæval times. It is called "Justice in 1500." A deer-stealer has been caught with red hands, just as he had shot a young stag. He is brought into the council-chamber of a young lord, of about the age of six years, whose mother sits at his left hand, not apparently taking much notice; the real actor in the scene being an ecclesiastic, who stands at the young magnate's right hand. The whole is a well-studied ideal of what might have happened at the period, but is not of a very high order. Nothing could be more beautiful than Vicat-Cole's grand summer landscape in the great room (No. 245), "Ripening Sunbeams." The landscape indeed stretches wondrously fair, no paling beauty anywhere—Nature is in her prime. The time chosen is just the beginning of harvest; a glorious scene of rich valley, well wooded, with oaks in richest foliage, stretching away as far as the eye can reach. In the foreground the rich golden corn, moved in many-shadowed waves, breathed on by the quiet wind; the only interruption to the stillness that prevails being the songs of the birds and the distant creaking of the heavily-laden waggon. It is a perfect and lovely picture of the fairest scene that England's richest prospect can offer to the enchanted sense. Bright and fresh is the sea that washes the shingle beach of the Fishermen's Village, No. 269. "Little to earn and many to keep" is evidently true enough of the rough old salt, who

has just returned from the herring fishery; and yet, rough and hard as his life is, he and his are not without their joys. As the hearty fellow kisses his healthy baby, his boy of ten or twelve walks off in triumph with his father's big boots under one arm, and a lot of herrings for dinner under the other. Both this and No. 275, "The Mushroom Gatherers," are capital productions of J. C. Hook's brush. An intimate study of nature, and especially of the ways and natures of the dwellers on our coast, is shown in these most natural and interesting scenes. The humour and felicity of choice of subject which is always observable in H. S. Marks' works is conspicuous this year. All three of his pictures are excellent. No. 73, "Intellect and Instinct," shows how the instinct of a dog may be sometimes more useful than the cleverness of man. An old gentleman is so engrossed in what he is reading as he walks, that he drops some of his papers in his forgetfulness. Doggy comes to the rescue, and stays by them doubtless till his master finds out his loss. No. 379, "Science is Measurement," is the diploma picture deposited as is the rule, on his election as an Academician. An ornithologist, with tape in hand, is measuring the skeleton of an adjutant-bird. There is a good deal of character about the enthusiastic savant. The drawing is perfect. The best of the three is "Old Friends" (No. 251). Two old Greenwich pensioners are wandering together over the yard of a ship-breaker, when they recognise their old friends, the figure-heads, which they once knew adorning the bows of some of the men-of-war of their younger days. It is evidently with great admiration that they look up to their old associates. T. S. Cooper's seven cattle-pieces are all of the same description that we have been used to for several years, perhaps a trifle more effeminate. The cattle are, if anything, cleaner and smoother than ever, and all of the same kind. Edwin Long this year, instead of one great subject, sends several. Though they are less conspicuous than such pictures as "The Gods and their Makers," of last exhibition, they are none the less admirable. "Esther" (No. 102) preparing to go into the king to plead for her people, sits full of her high purpose, yet anxious and fearful, while her handmaids array her in lovely Eastern costume, themselves doubtful and sorrowing for the danger of their beloved mistress—for who could fail to love her? What strikes one in this picture is the perfect unity in all the parts. The companion, "Vashti" (No. 955), is nearly as good. She is represented as a beautiful blonde, angry and grieved—weeping at the unreasonable anger of the infatuated king. We reserve for future notice the two other works of this accomplished painter.

ARCHITECTURE AT THE ROYAL ACADEMY.

[SECOND NOTICE.]

ARCHITECTURE, as one of the arts supposed to be taken under the fostering care of the Royal Academy, is more meagrely represented this year than last. Only two of the walls of the one gallery devoted to works of this class are occupied; the screen has been given up to etchings and engravings, so that actually British architects are confined to the smallest half of the gallery at Burlington House. This may appear a slight matter; but it fortunately happens that the Academy show does not fairly represent the architectural ability of the country, for somehow works are exhibited there that ought not to find a place upon the walls at all, while of the principal works of the year there is a very indifferent exhibition. As we last week took a general survey of the drawings, we shall in the present

notice take up those works only which are of representative interest. Rampant "Queen Anne" is certainly more moderately displayed this year, for, with the exception of Mr. J. J. Stevenson's "Ken Hill, Norfolk," (1,069), itself very moderate, and a few other very temperate drawings of residences, in a style that can only be regarded by a stretch of the imagination as coming under that designation, we see no attempt at sensationalism in style. So far this is a healthy sign. Mr. Stevenson's water-colour drawing shows a massively treated country residence, with none of that frittered effect we have before complained of. The yellowish tint of the stone walling does not certainly produce the happiest contrast of colour with the red tiled roof; the windows have pilasters and arched mouldings or pediments, inclosing the vousoirs, but the recessed bay window is open to question. Is this feature of inclosing a canted bay in an arched recess a hobby of certain followers of the style, or is it supposed to be an artistic feature? Till we have a satisfactory reply we must consider it a crotchet. One of the most noticeable examples of domestic architecture is Mr. Arthur W. Blomfield's "Denton Hall, Grantham." It is conceived in a quiet English spirit of Late Gothic, without any frivolous or capricious leaning to other styles, or straining for mere quaintness' sake. We should have liked to have seen a little more appearance of connection in the offices; but this effect is largely due to the want of breadth of shade in the drawing, a capital pen-and-ink one in other respects. Mr. Geo. Corson sends two bold ink perspectives, one of his School Board Offices at Leeds, and the other of the Municipal Buildings and Free Library in that town. In the latter we detect a very complete revision of the first competitive design—certainly an improvement, as we always thought the first rather monotonous in the sky-line. The drawings are anything but artistically rendered, and appear almost rigid in their severity of treatment. A few figures in the foreground, and a little more shading in the last-named, would have relieved the uncompromising austerity in the lines of the architecture, which at present have an unfinished air. Mr. Corson has adopted a free, though stern, phase of Palladian composition, which will associate well with the Town Hall. Mr. John Honeyman, in "Skipness, Argyllshire," has given a pleasing but chastely simple design; and Messrs. E. George and Peto have, in 1,086 and 1,087, contributed exceedingly piquant sepia sketches in a style they are not only admirably conversant with, but know how to render in a thoroughly artistic spirit. The "House at Pinner" (1,086) is equal to anything we have seen from Mr. Shaw himself; but the sepia drawing, of course, adds to the picturesqueness inherent in the style, and is a species of drawing we should be glad to see more largely employed for architectural purposes.

After looking at Messrs. George and Peto's sketches, "Knowle House, Wilts" (1,084), by Mr. R. H. Carpenter and B. Ingelow, has an exceedingly mechanical appearance about it due to the drawing which is not in the happiest tone of colour. As an architectural design of an Elizabethan type it has merits; the bay windows are well managed, and there is a breadth of treatment that reminds one of the Baronial style of the North, though the chimney caps are heavy. We hardly like "Two Houses at Stoneysgate, Leicester" (1,091), by Mr. Isaac Barradale, albeit the drawing is excellent. Canted windows have an awkward effect when carried up as gables; the bracketed treatment also is somewhat unsatisfactory, and gives a restless, fidgetty effect to the composition. The designs for the Church of the Oratory, Brompton, are numerous—perhaps overdone in the present exhibition. We are

certainly charmed with Mr. Geo. Nattress's fine water-colour drawing showing the west front of his design. While we do not approve of the design, or of the particular Venetian Renaissance model he has chosen for a London site, we admire the composition, and especially the tower. Mr. G. Gilbert Scott's design for the same church, showing the interior (1,100), is also cleverly and transparently coloured, though we take exception to the wide arches and the carved panelling in soffits and pilasters as rather redundant. No. 1,199, the selected design for this work, by Mr. Herbert Gribble, occupies the central position on the wall, and we need not say more than we have already said critically of the architecture, which we illustrated both internally and externally in our last number. As an architectural drawing in colour, Mr. Gribble's interior, if rather weak and washy, can fairly compete with any in the room. The drawing of the arcade is exceptionally good, though we note the arch to the right is a little depressed; the colouring to the domical vault is quiet and harmonious, and the artist has produced a softened aerial effect almost to the fault of indecision, that gives scale, while it avoids that oppressive sense of colour and detail a cruder or more liny drawing would have given. One of the most pleasing water-colour sketches in the room is 1,094, Mr. A. Waterhouse's "Interior of New Court, Carey-street, Lincoln's-inn." Mr. Waterhouse has selected for his view certainly the most favourable point; the group of trees introduced, and the reflected light on the shaded side of quadrangle are very cleverly handled, and the drawing is in the happiest style of the author. The same architect's view of new offices of the Prudential Assurance Company, in Holborn, which we have illustrated in detail, hardly does justice to the design, and the return is rather more sharply drawn than is pleasing. A cleverly drawn water-colour view of the Giant's Stairs, Ducal Palace, Venice, by Mr. John Burney, is a delightful study of architecture and colour, though placed too high. Mr. Waterhouse also sends some new buildings at Pembroke College, Cambridge (1,102), certainly among the best examples of his work; but the arched stone parapet and the turrets scarcely make a pleasing combination with the Late Gothic and the red brick—but the building in the rear is more characteristic. No. 1,112, "View of Tower of St. Paul's, Manchester," by Mr. J. Oldrid Scott, is a finely proportioned work, with a gabled summit, from the intersection of the roofs of which springs a spire or flèche. The detail of the belfry stage is quiet and refined. The "Takhtsingji Hospital, Bhavnagar, India," in a Saracenic style, is a cleverly coloured drawing, in which the tropical tints of stone and sky have been ably depicted by the artist. Mr. Emerson has become thoroughly imbued with the Indo-Saracenic peculiarities, as this work testifies. Messrs. Goldie and Childs' interior for the Church of the Oratory, Brompton (1,110) competes favourably with those already noticed; the gilding is perhaps rather overdone, and whether the vaulted ceiling is circular or elliptical is not very apparent from the drawing, as the panelled soffits of the transverse arches are drawn as elliptical in the nearest bay, and circular in the distant bays. Mr. Basil Champneys in the "Divinity and Literary Schools, for the University of Cambridge" has shown a very rich example of Late Gothic, handled with considerable moderation, taste, and refinement; it is perhaps the best work of the kind in the gallery, as our readers may see for themselves this week. We pass a clever sketch for "Pulpit, Canford Church" (1,119), by Mr. W. C. Brangwyn, in which the author has endeavoured, if he has not fully succeeded, in treating that most difficult of all objects, a church pulpit. Mr. T. H. Wyatt's "Hospi-

tal for Consumption, Brompton," is certainly in a rather heavy style of red brick and stone; the brick preponderates, and the chief recommendation of the building—if it is one—is that it is hospital-like. We certainly prefer ourselves Mr. T. Roger Smith's design for consumptive patients at Hampstead, at the other end of room (1,173), conceived in a French chateau style of Louis XIV., and having more the character of a home for the sick, the recessed window treatment and balconies being especially a contrast to those of the former work. Mr. Smith's building is at least cheerful-looking, and will crown Vernon Mount with dignity. A painstaking drawing, executed by Mr. Maurice B. Adams, evincing much labour, shows Mr. Gilbert R. Redgrave's "English Half-timbered house at the Paris Exhibition" (1,103). It has been illustrated by us, and we need only remark that its great fault is over-elaboration in the timber ornamentation, and it scarcely can be taken as an example of English-framed houses, in which we have always remarked great breadth and simplicity. To show what diverse pattern can be introduced Mr. Redgrave's design serves admirably. The design exhibited for the Hampstead Hospital by Messrs. Tasker, Batherbury, and Huxley (1,125) is far too cut up, and the drawing has a rather crowded effect. Below we notice 1,126, "Interior of Chapel of St. David's College, Lampeter," by Mr. T. G. Jackson, cleverly drawn as a study of harmony in colour in the new blue-green shade. The roof, screen, and stalls are pleasingly harmonised in the general effect. Mr. Robert W. Edis exhibits a large and conspicuous line drawing of a house in New Bond-street, which we shall illustrate next week (1,132), displaying some skill in the treatment of a narrow frontage. Mr. Edis adopts a free kind of Renaissance, in which English and French detail is pleasingly combined. The fenestration is connected, and the only fault we find is with the elliptical-headed window below the corbelled circular oriel, the treatment of which is not in keeping. Mr. G. E. Street is represented by six choice exhibits in his usual style. We may notice St. Mary's Church, Speenhamland, Berks (1,133), as the least successful, and "Birds'-eye View of St. Margaret's, East Grinstead" (1,143), his best. The tower is treated as only Mr. Street or Mr. Pearson could treat it; it has a gabled or saddle-back finish, pierced by a series of lancets, very simple but dignified. The guests' house, cloister, kitchen-court, are appropriately treated, and the drawing is light and transparent. St. Peter's Church, Bournemouth, showing the spire (1,158), is perhaps one of the most successful of Mr. Street's smaller brick churches. The tower is dignified and remarkably quiet, pierced as it is with two lofty lancets in the upper story; the new spire is small, and is supported at its springing by pinnacles with small flying buttresses, while round the lower part of it is a series of gabled lights. Already the tower forms a highly picturesque object at Bournemouth, and we hope to illustrate it shortly. The same architect's "Designs for Houses in Cadogan-square" (1,174), is thoroughly Venetian in sentiment, and of less merit, though, as one of the domestic works of Mr. Street, it is interesting. A peculiar feature of the design is the angle balcony over porch, rather more fanciful than welcome. As a diversion amid the "Queen Anne" craze in that locality, it will be welcome. The drawing is rather spotty in effect. Messrs. Goldie and Child contribute (1,134) Interior of their Dominican Church, Waterford, a Romanesque interior, transparent in tone; and Messrs. George and Peto, some delightful cottages at Pinner (1,140); and a clever study for a drawing-room ceiling by Mr. G. G. Fox, harmonious in the choice of colour, though a trifle heavy in the cof-

fering. Unpretending as a cruciform treatment in an Early style is Mr. Blomfield's "Church of St. John the Evangelist, Wentbridge, Yorkshire" (1,136); Mr. W. West Neve's "Warehouses in Devonshire-street, City," though hung rather high, shows a sensible treatment of shop-fronts for narrow and dark streets. Occupying the place of honour in the top line is a large, exceedingly heavy coloured drawing, entitled "Decorations and Furniture," by Mr. W. Hensman, in a sort of Renaissance. The colouring is harmonious, but the architectural treatment of ceiling is ponderous, partly, perhaps, due to the depth of tone of the drawing. Mr. John D. Sedding sends a prettily timbered grange (1,159) in a clever and feeling drawing, which we intend to illustrate. It is marked by breadth, balance, and a delicacy of detail characteristic of this gentleman's work. Mr. T. G. Jackson's "New Quadrangle for Merton College, Oxford" (1,164), is a sepia bird's-eye view executed with much care, almost in the style of architectural colouring of half-a-century ago. The buildings shown are Renaissance, English in feeling. "Carlyle House, Chelsea Embankment" (1,163), by Mr. Adolphus Croft,—illustrated this week—is rather too broken up to be deemed a pleasing example of the style it reproduces; and we turn to Mr. Phené Spiers's mansion in the same locality (1,153) with relief, albeit it is a trifle fiery in colour. A sensible kind of brick Renaissance is chosen, this material being introduced largely in strings, pilasters, arches, window joints, and porch. The whole is crowned by a red-tile roof. We must notice in this review Mr. W. Scott's "Design for a Provincial Town Hall," which has been illustrated in our pages. This work has been singularly selected to occupy a place of honour on the walls, and in saying this we do not wish to disparage in the slightest the able drawing and conscientious labour of its author. There is ample evidence of skill in design in the drawing, but as a composition, we cannot say much in praise of it, and we hope Mr. Scott will be content next time to give us something less profuse, more moderate in his choice of architectural dialects, less hybrid and broken. One of the choicest, as it is one of the most delicate and artistic, drawings is Mr. Norman Shaw's "View of Adcote, Shropshire," which has been already illustrated in our pages. This is a diploma work, deposited by Mr. Shaw on his election as Academician, and admirably sustains that gentleman's reputation as a master of domestic English architecture of the later and more picturesque phases. It is impossible to say too much for the transparency, crispness, and detail of this line drawing and the finish and feeling it exhibits. Mr. W. Emerson's proposed tower for St. Mary's Church, Brighton, is a very fine composition; a low, circular slated spire springs from the square tower, and its grouping with the angle turrets produces a rich effect without loss of outline. We can only notice further in these remarks Mr. G. Gilbert Scott's façade for St. James' Church, Marylebone (1,178), as a remarkable but able design in a Venetian style. In concluding the present notice, we must remark a notable absence this year of any great works of composition or invention. There are few really striking architectural exhibits in any branch, and generally the exhibition is richer in drawings of a decidedly descriptive, if moderate character.

THE RAMSGATE NEW ROAD COMPETITION.

THOSE who have visited Ramsgate are probably aware that the frontage to the sea of that favourite watering-place has

a somewhat broken line of cliffs, that is to say, the steep escarpment is interrupted by a hollow in the centre, so that the cliffs on the east and west of the town are disconnected from each other, and the centre of the town in consequence forms a sort of chasm, destroying any means of easy communication. The Ramsgate Improvement Commissioners have lately determined, under a recent Act, to form a connecting link between these cliffs on the east and west, and accordingly invited engineers and architects to send in plans for that purpose, the result of which invitation is that no fewer than sixty-five sets of designs have been received, which are now on view on the West Cliff. As we intimated last week, Mr. Jas. Abernethy, C.E., has reported upon the plans and has awarded the first premium of £200 to the plan with motto "The Desideratum," by Mr. A. Cumings, of Tunbridge; the second premium of £100 to "Nee Timeo nec Spero," by Mr. Geo. Higgin, of Great George-street, Westminster; and the third of £50 to "Progrès," by Mr. J. Cardell Tounson, of Penzance. These plans selected by Mr. Abernethy will not, we understand, necessarily determine the scheme to be carried out, as the Board will exercise their own discretion in the matter, and the whole of the plans will be considered before a final decision is arrived at. It is at least satisfactory to hear that the Commissioners have not committed themselves to either of the three designs in its entirety, but that the schemes of the other competitors will be taken into consideration and a meeting of the ratepayers called to assist in the solution of so important a question for the town.

Let us first take the three plans upon which Mr. Abernethy has reported favourably. It is very obvious that there are two modes of dealing with the roadway: the first is that of making it connect the cliffs by slightly easing the gradients and allowing it to cross the existing streets on the level, taking a line more or less set back from the sea front, and a second plan is that of a high level roadway or viaduct connecting the cliffs at an easy inclination on each side, the viaduct crossing over existing streets in the hollow part of the town, and following a line of route on the front. We accordingly find the plans divide themselves broadly into these two classes, though there are several that show a treatment more or less of a compromise. "Desideratum" has adopted the first course, or the route suggested in the Parliamentary plan. It has the merit of at least connecting in an easy manner the West with the East Cliff without cutting too far inland, or necessitating a costly scheme of alteration of the existing streets. Starting from the West Cliff, the road follows the course of Military-road for some distance, which level it leaves unaltered; it then passes over a viaduct 227 yards long, to carry a widening of existing road over cliff, and passes over York-street on another viaduct of simpler kind. Crossing Harbour street on the level, it gradually rises, embanked by retaining walls, to Wellington-crescent, where it is carried with open parapets on the present levels. The gradients are 1 in 22 from Princes-street to Harbour-street; then a rise of 1 in 20 from the latter to Albion-place, after which, to Wellington-crescent, the present road level is slightly lowered. The widening of roadway over cliff on the western side is proposed to be accomplished by building arches into the solid cliff, the front of which is to be faced with concrete in blocks; the viaduct to have red brick spandrels, with pilasters and plinth of Portland stone. Access to the railway from the town is facilitated by a branch road from Albion-place, and it is proposed to widen the steps to the sands. The line is a good one, but we think the approaches in the centre of the town might be improved by a circus at Harbour-street crossing. The

estimated cost is £40,982. "Nee Timeo nec Spero" shows a high-level scheme, somewhat similar in route. The 50ft. roadway is carried by a widening-out of the cliff on the west by retaining walls; from Princes-street a viaduct of 226 yards is carried over the town, Princess, Leopold, Farley, York, and Harbour-streets, the road then passing in a diagonal direction through Albion-place-gardens; thence skirting the East Cliff promenade. The gradients are very easy, 925ft. being horizontal. We do not like the retaining wall mode of dealing with the West Cliff, which will present an unsightly front to the sea; and another disadvantage of the plan is that it presents no compensation for property taken, and advantage is not taken of the ready means of gaining store-room in the cliff. The estimated cost is £28,938. "Progrès" is a low-level road, the gradients being reduced on both sides, and the line of route chosen is a pleasing curve of double flexure; and this line, we may observe, is the natural frontage line of the town. The gradients are one in 150 to Rosehill, one in 224 to Harbour-street, then rising by one in 20 to Wellington-crescent on the east side. A viaduct crosses Princess, Leopold and Farley-streets, with steps; York-street is crossed by a girder bridge, Harbour-street level remaining unaltered. The arches are proposed to be of brick and concrete, and the roadway on West Cliff is widened by a series of arches built into the chalk rock with a retaining wall at the back, which presents the appearance of a viaduct to the front. This method has been adopted by several competitors, and is the least unsightly mode of widening the roadway over Military-road, and facing an escarpment in some places over 50ft. high. The design is well-shown by neatly-drawn elevations, and the plan certainly has the merit of being one of the best digested schemes for inclined approaches; cost is estimated at £20,481. "Che Sara Sara," follows the Military-road as far as York-street, then passes behind the Royal Hotel. The design shows an arched facing along the western cliff, the arches being utilised for stores; the gradient is rather steep, namely, 1 in 17½, as the road descends to Harbour-street. The author says by the adoption of this route the "principal hotels are untouched, their approaches improved, and few buildings interfered with"; but such a plea, we think, can hardly be urged unless the buildings preserved were really worth retention, or archaeologically interesting, which is not the case in the present instance. The lowest part of the new roadway is at York-street, and advantage is taken of this to form a cartway 20ft. wide as an approach to Military-road and basin. The estimate given for this plan is £28,387, and there is a carefully-tinted sepia elevation showing the viaduct. Another design under the same motto, distinguished by a square with 1'1—shows a route further back, cutting the centre streets, with retaining walls along the west cliff, following the present levels pretty closely. "Audacter et sincere" is the motto of an undoubtedly able plan, showing a front route and a high level roadway, and we hope that this and another design to be mentioned hereafter will be carefully examined. The plan shows a pleasing curve of roadway, following the cliff and basin of harbour with quadrant approaches on the east and west into Harbour-street as the central street of the town, so that the traffic from the middle portion may take an eastward or a westward direction to the new promenade, besides an improved approach to the station and sands. This diversion has been strangely overlooked by many of the competitors. The author of this design observes justly that though this route necessitates the removal of valuable property as compared with that further inland, he can obtain improved building sites, while the spaces under the

arches of viaduct can be let as shops and stores, so that the removal of the front properties, certainly not valuable at present, will more than compensate for the increased outlay at first. By this plan the cliffs are connected by easy promenades crossing over existing streets, and following the frontage line of the harbour, with uninterrupted views of the sea. A cleverly tinted sketch in sepia accompanies this design, showing the improved frontages and blocks of buildings that might be built at the junction of viaduct with Harbour-street, and the viaduct itself is made to form a sort of stylobate or platform for the new houses. The author has kept in view the fourth clause of the instructions issued, which provides, first, that the road shall, so far as possible, be kept to the front; secondly, provide access to the centre of town and to the sands; and, thirdly, interfere as little as possible with Military-road and the inner harbour. Another very able plan is that of "Westminster," it is rumoured by Mr. Ellice Clark and Mr. Pugin. This design is illustrated by a large coloured view of the town of panoramic comprehension. A high level promenade along the sea front, with roads in connection with it, forming easy access to the centre of town and with an approach to the sands, east pier, and London and Chatham Railway station, are its leading features. The gradients are easy, and the curved western branch road from the main route brings the business part of Ramsgate into immediate connection with the west cliff and harbour. Harbour-street is crossed by a bridge 20ft. above the present level, and new frontages are obtained both to the promenade and to that street, the latter having shops. Princes-street is widened and York-street crossed by an arch. On the east side two roads diverge from Club-alley, one leading to Harbour-street and the other to the sands and railway station; the custom-house is proposed to be removed, and Harbour-street to be widened. No. 2, an alternative scheme, follows the line of the Parliamentary deposited plan, but is obviously inferior in point of convenience and in the lines of promenade. The estimated cost of this design is £29,000. In the design under the motto "Front" the author, Mr. W. G. Osborne, architect, of Ramsgate, follows the line of front to the sea and steers to the west of the Albion Hotel. The plan shows a viaduct of ornamental design, girder bridges crossing Harbour-street and York-street, and a viaduct from York street to the end of York-terrace. The gradients are easy, and the steepest is 1 in 25. One very good feature in this design is that the frontages are well dealt with, shops and stores being proposed under York-terrace from the Street to Farley-place, the basements of the new houses being above the shops. The author sets back the houses 10ft. from the viaduct so as to give light to the shops below, and the elevation exhibited is designed with taste, the horizontal girders of the viaduct forming a kind of balcony to the façade. Branched approaches are shown to Harbour-street which is suggested to be widened at the Custom House. The estimate is £31,000. These three last mentioned plans have decided merits, and might, taken with with one another, suggest the bases of a good scheme for bridging the chasm between the cliffs, and connecting the town as well as improving the architectural effect towards the sea. "Well Considered" is almost a daring scheme. It has a front level viaduct about 51ft. high, starting from Rose-hill to a point opposite Railway station, another inland route branching from it to form an inner loop intended to give easy approaches to the town from both cliffs. The drawings are cleverly executed in India ink, and suggest an arcade running along the Viaduct, and the openings of the latter filled with residences and shops, the chimneys passing out through the arcade. The idea

is bolder than desirable, and the strip of houses between the two roads would not be a very pleasing arrangement. "A.D. 1879," adopts a serpentine line of promenade intersecting the streets in the centre of town. The sketch shows a viaduct with sites for terraces and houses between Princes-street and Albion-place, and a narrower roadway connecting the centre streets in the rear. The Harbour-street level is unaltered, concrete arches carrying roadway over York-street. "Percy Britton" adopts a front drive, the West Cliff is arched in front as in other cases, there is a bridge over York-street, the road crossing Harbour-street on the level. Albion-hill is diverted. Prodigious both in scale and scheme is the design of "Viator" No. 2. The plan shows a long front carriage roads or inclines, with descent to the Harbour, the gradients being 1 in 30, and 1 in 22, but no access to centre of town. The cantilever footpaths to widen the roadway along the cliff are certainly ingenious, but we hesitate to call them desirable or even elegant. The face of cliff is relieved by an arcade of pointed arches with a retaining wall above. "Progre diendo Prosperi" is a high-level scheme showing a parade carried by arches over York and Harbour-streets, with inclines as well on each side. In "Economist," the main road is made to skirt the basin, while another branch road from centre of town to the Custom House is indicated upon the Government survey. We can refer only in very brief terms to several others which follow, more or less, the Parliamentary plan. "Non Nobis Solum" exhibits unnecessary labour in indicating the drainage. The road is made to follow the ground-levels crossing over York-street, and crossing on the level Harbour-street, the rise to East Cliff, 1 in 14.5, being fatal to the plan. "Circle and Cross" is a high-level roadway following the line of harbour; houses and shops are shown below the viaduct. "Indicta," also a front retaining-wall and viaduct scheme, just clears the Royal and Albion Hotels, with a road crossing Harbour-street on the level. "Nec Timere nec timide" is a carefully-worked-out design for a semi-viaduct low-level plan, the route being made to clear Crown Hotel, passing behind the Albion. "Camino" spans the valley, and shows steps to quay. It is economical; the gradients are improved; the levels on east and west are unaltered, but the line of roadway is not easy in curvature. "Veritas Vincit" leaves extreme levels, and, like the last, bridges the streets in the centre; but a score of other designs have, for the sake of meeting existing levels, shown a variety of ungraceful bends and right-angled arrangements that perfectly destroy the beauty a marine promenade should possess. Among the best of these we notice "Advance," "Ajax," "Respiece Finem," "Veritas Vincit," "Fido," "Keep on Terra Firma," &c., "Science with Practice," "Tokio," "Artibus et Armis," "Honor Virtutis Premiam," "Thorough," "Industry," "Excelsior," "The Link," "Curve Chemin Passant," "Via Melior Iter Brevius," "Pro Bono Publico," "Silver Streak," "Sphinx," "Q. E. D.," "Z," &c. The Commissioners are to be congratulated on having received such a large number of designs, many of much merit; but we desire to call attention to the points that appear to us necessary to be kept in view in coming to a satisfactory final decision. In the first instance, we hope Ramsgate will not suffer by the adoption of a piecemeal scheme or a niggardly regard to outlay. We think that the plan chosen should be something more than an affair of mere engineering; it should consult the picturesque, or rather the architectural, feeling in the treatment of the new promenade, by uniting the cliffs in a graceful manner, and without destroying the rocks themselves, or turning them into high railway embankments or retaining-walls. A

viaduct, always a pleasing feature, might be easily made to combine effectively with the East and West Cliffs. Beyond this, we consider that preference should be given to those plans that would sweep away the hovels in the centre of Ramsgate, and provide a frontage promenade with branch approaches from the town, those giving easy gradients to the present streets, bridging over the existing chasm in the only possibly dignified manner, and offering a façade to the sea worthy of this favourite Kentish seaside resort.

TEMPORARY BUILDINGS.

THE erection of structures of a temporary kind, at once light, cheap, and portable, is a want that has been strangely neglected by the architect, notwithstanding the numerous demands for such a class of structure and our colonising propensities. It must be confessed that, in spite of the necessities of emigration, our large mining and agricultural population, and our army organisation, together with the use of temporary buildings in the shape of mission houses, churches, schools, and drill sheds, we have not produced anything more satisfactory than wooden and iron buildings of the most primitive description and unredeeming ugliness. It seldom seems to have entered the heads of our utilitarian builders that considerable improvement might be attained if they adopted the materials each country or district afforded, instead of persisting in transporting frames of timber and matched boards after a set specification; and it is surprising to find Government and other contractors adopting iron for the sides of buildings, when timber and concrete are far better and more durable. In the present article we shall first confine our attention to the modes of construction usually adopted, reserving for subsequent remarks a few suggestions upon the subject of temporary erections.

One of the commonest modes of erecting temporary buildings is that of having uprights placed upon brick or masonry foundations at intervals of from 12 to 15 inches apart, boarded on one or both sides, and covered by roofs of the same material. Framed timbers filled in with intermediate posts of lesser scantling make the most substantial walls—the framings, in fact, resemble the framed partitions to houses, with sills, heads, corners, door and window posts, and diagonal braces to throw the strains upon the solid portions of the foundation. The lighter uprights afford a fixing to the outer and inner boarding. Scantlings for the framing are generally about 4in. by 3in., but, for the filling-in, uprights 4in. by 2in. are generally sufficient. These framed sides seldom exceed 8ft. to 10ft. in height, and the lower they are kept in reason the better. The roofs are generally simply framed with collars, the inside lining of matched boards being carried round them. As regards the outer covering to the walls and roof, weather boarding is that generally used. This consists of plain boards, about 3in. thick, laid with a lap joint horizontally, though other forms of making the joints are sometimes used, such as rebating one edge of every board for the lower one to fit into. Roofs are generally of wood, with every alternate board covering the edges of the lower one, or a lap joint following the length of the rafters, or otherwise they are placed close to each other with a fillet over the joint. The latter method is frequently used. Slate, zinc, and corrugated iron are common coverings; but the best roofs are those that are slated upon felt, and the least satisfactory roofs the metal-covered. If we examine one of the emigrants' huts or wooden erections adopted by the War Office, we find it generally a rectangular-shaped hut, divided into two or three parts by partitions running across it,

with centre doorways, the middle division having a door on the outer side with two windows made to light the end apartments, at the same time, the partitions dividing each window into two. The size of hut is often about 21ft. by 16ft., and 7ft. or 8ft. high to the eaves. The centre apartment forms the living-room, and the others the bedrooms. The framing is of red deal 3in. thick, the floor is of lin. boards, and the roof and sides of 3in. weather boarding. The roof is often felted. The houses can be packed in a small compass, and cost about £40 to £50. Cottages of larger size, with four or more rooms, and a lean-to washhouse and pantry, are made in the same manner; and rows of cottages with brick party-walls, each about 22ft. square, with a kitchen or living-room and two bedrooms, each 11ft. by 8ft., leading out of it, are constructed for labourers and miners in districts where no house accommodation can be found. In South Wales and in the mining districts this kind of erection is largely used, the houses being let to the workmen by the colliery proprietors. But they are at the best but cold and comfortless dwellings, though every precaution is taken to render them dry and convenient. A rough rubble wall is built to receive the sills and joists, the framing is covered with 2in. outside boarding and 3in. inside lining. The outside receives three coats of oil paint, and the interior lining is sized, stained, and varnished. The cost of these cottages vary from £75 to £100 each, or from £15 to £20 per square. School-rooms, drill and mission halls, and churches, besides buildings erected for exhibitions and congress meetings, are built upon a similar principle, the framing being about 4in. thick, and the roof constructed of framed principals or upon the excellent plan of laminated ribs; but of all these it must be said, they are never comfortable and always unsatisfactory in appearance, resembling rather huge packing-cases than buildings for human beings. Anything more tasteless, comfortless, and forbidding than the corrugated iron church of the usual type it is scarcely possible to find. Churches and schools of corrugated iron are frequently to be met with, and temporary buildings of this class will always be in request in large poor and populous districts, where permanent church accommodation cannot be provided. As a rule they are of the most stereotyped form and are erected by manufacturing firms upon certain illustrated models, at prices according to size or accommodation. A church for 400, covered with zinc laid on rolls, will cost probably between £700 and £800, though the last figure is nearer the mark. Its size will be about 70ft. long by 30ft. wide. The roofs are generally framed with a collar and iron ties looped up to a king rod, but the scantlings and details are of the most meagre and mechanical description. The temporary churches to be seen in the metropolis are disfigurements to the neighbourhoods they occupy, and are generally so cold and comfortless inside that it would surely answer to erect buildings of a more substantial and slightly character that would draw larger congregations and might be utilised for a similar purpose after they were done with, or turned into schools and club rooms.

In speaking of the temporary church of the usual type, we have pleasure in drawing attention to an improved construction. We refer the reader to a church (All Hallows) that has been erected in Orange-street, Southwark, from the designs of Mr. C. N. MacIntyre North, of the Borough High-street, the whole of the timber framing of which is bolted together, so that it can be taken down and re-erected at a trifling cost. The dimensions of the church in question are 74ft. long, and, exclusive of transept, 26ft. wide. It is of one span, with recesses or transeptal projections for the harmonium

and vestry, and an apsidal end. The roof has framed principals, with collars and curved ribs, which rest on inside square pillars, these latter continuing to the underside of principal rafters, which they help to support, and at the same time form lateral aisle passages. The purlins are boarded in squares, then felted and slated. The walls are of brick, the window-frames are deal, chamfered, with oak sills, and the lights are glazed with lead glazing. Inside, the boarding to roof, and the woodwork generally, are stained and varnished; the church is furnished with chairs, and seats 280 people, exclusive of choir, the total cost, including pulpit, an open, framed screen, seats, and gasfittings, being £691. Externally, Mr. North has treated the building in a simple, unpretending manner, a three-light window, and a small bell-cote bracketed over it, forming the only features at the west end. We consider buildings of this class much cheaper and more profitable than the galvanised iron and zinc buildings in which nave and aisles, clerestories, towers and spires, and other accessories to the permanent church, are reproduced with unmeaning completeness and tasteless detail. Timber-framed structures, filled in with concrete, or tiled externally, might be constructed in a similar manner to that we have described above. We have long desired to draw attention to a few methods by which temporary buildings may be made more artistic. We should begin by acknowledging a general principle, that each locality should furnish the materials necessary where timber is plentiful. We cannot do better than follow the type suggested to us by the earliest dwellers on the Upper Indus, whose dwellings have been so graphically described by Viollet-le-Duc. Unwrought timbers packed together and crossed at the angles, and built on brick or stone foundations, might be made into excellent cottages in districts where wood is plentiful, as skilled labour could be dispensed with; the openings for doors and windows could be roughly framed upon the lower walls, and the roof could be covered with thatch or tiles, the walls plastered with stiff clay or mortar. In places less remote from the appliances of the skilled carpenter, wrought timbers might be substituted for the framework of such buildings; the sides may then be filled up with pise, brick, or stone, or better, with concrete, the materials of which are generally accessible. A species of wattle wall plastered over, or better, lattice-work, might be admirably used as a skeleton framework for cottage walls. We have seen capital cottages built with timber framing filled in with concrete, but we would suggest that blocks of that material cast in the form of hollow bricks, might be used for the purpose. These could be made to interlock with one another. Perforations in the bricks should be left inside to form keys to the plastering, or a lining of matched boards could be fixed to the studwork. We think that these materials combined would furnish a far more comfortable dwelling than one of brick or wood only, which latter dwellings are generally built in the most flimsy fashion; the principal considerations in temporary buildings are—walls that shall occupy little space, can be easily erected, and be thoroughly weatherproof. In fact, the problem of building cheaply and artistically really resolves itself into finding a substitute for brick walls, some material that can be more readily made or transported, and put together by unskilled labourers. Patented systems are, after all, for a time at least, monopolies, and really common-sense and artistic ingenuity have only to be employed together, to arrive at satisfactory results with the methods and materials ready to our hands.

Captain James O'Hara has been appointed inspector under the Local Government Board of Ireland in the place of Mr. Samuel Horsley, resigned.

IMPROVEMENTS IN ST. PAUL'S CHURCHYARD.

CONSIDERABLE alterations are being made round St. Paul's Cathedral, under the direction of Mr. F. C. Penrose, which will have the effect of apparently widening the area round the Cathedral, and removing that gloomy, barrier-like seclusiveness with which our great metropolitan church has been so long invested. One of the greatest of these improvements has been the lowering of the railing of east-iron, the wall that formerly surrounded the churchyard having been recently reduced about 18 inches in height. The railing itself is unquestionably a remarkably fine example of ironwork of the Queen Anne age, and is well worth the examination of all who are interested in workmanship of that period, though we suspect there are few who have really examined it with attention. The uprights form columns, with capitals of Tuscan character moulded below like balusters; the standards at the angles, transepts, and gates are massively grouped in square and circular form. These are being carefully replaced upon the dwarf wall, the whole of the railing having been carefully cleaned and repaired where necessary. In connection with this part of the alterations, we may observe that the eastern corners of the churchyard have been thrown into the road opposite St. Paul's School, and the railing made to follow inverted curves inwards. On the south side the improvement is even more apparent than on the north; but in addition to the reduction of the height of railing, it has been set back about 6 or 7 feet, thereby giving a footpath round that crowded thoroughfare on the south side leading to Cannon-street.

On entering the enclosure, we observe that the churchyard has been altered in its levels, and laid out as a garden, with winding paths, while several groups of shrubs and trees have been planted on both sides of the cathedral. Since Mr. Penrose read his interesting paper at the Institute, a report of which we gave at the time (see pp. 132, 183 of present vol.), one or two remarkable discoveries have been made. On the southern side a further clearing away of soil has revealed the outer south-east angle of the cloister, and a portion of the surrounding passage is now cleared and bared to the pavement, the diagonal squares of which, of Purbeck marble, may be seen. The remains of the buttresses and of wall shaft bases to the cloister have been thoroughly exposed, and appear as crisp as when first executed, in some parts. The responds, with their octagonal bases and mouldings of Purbeck marble, are clearly exhibited, and the plan of the shafts themselves can be made out. These are small engaged clustered shafts, separated by hollows. Mr. Penrose has attributed this work to the end of the 14th century, though the character of the mouldings would seem to indicate to us a later date. We refer to a plan we gave, page 183. *ante*. Excavations carried on at the north-east angle, in pursuance of the scheme of exploration of the architect, have been rewarded recently with a still more important discovery, that of the foundations of St. Paul's Cross, a result which Mr. Penrose never despaired of. The foundations of this famous cross have been discovered at the north-east angle of the choir, and are partly covered by the present building. A plan we have seen makes the out-to-out dimensions about 33ft., or those of the circumscribed square. If we range the line of the eastern side of the choir on the outside, that is the square portion of it, the octagon projects about 10 to 12ft. eastwards; but the axis of the octagon is not parallel with that of the cathedral, but slightly divergent westwards.

This discovery will be hailed as a very important link by archaeologists, connecting as it does the most memorable period of our history with later times. St. Paul's Cross we read of as early as 1259, in Henry III.'s reign, as a town preaching cross; it was associated with some memorable occurrences, as the penance of Jane Shore, Dr. Shawe's infamous sermon, the fulminations published against Luther, but its chief interest resides in the fact that from its pulpit the earlier Reformers preached their sermons, and it was used for preaching till 1643, when it was demolished by order of Parliament. The earlier prints of St. Paul's Cross show it as a small octagonal structure of wood, raised upon a platform of three steps of the same form, with a pulpit projecting from one of its sides. Seats surrounded it. It is proposed to mark the site of the cross by a pavement, so as to distinguish its position for all time, and we heartily commend the idea. The other portions of the churchyard on the north side are being laid out with paths. A fountain of circular shape is to be placed in the space between the transept and the eastern extremity of the cathedral, close to the site of St. Paul's Cross, and the foundations have already been prepared for this purpose. These discoveries and improvements, due to the untiring energy of the Dean and Chapter and their zealous architect, will convert St. Paul's churchyard from the neglected and gloomy condition in which it has so long remained into an attractive centre worthy of the edifice. We may only express the wish that a still greater improvement, long talked of, will some day supplement these efforts by the setting back of the property on the north side and the rebuilding of the frontages, and we are sure the cost of purchase and compensation would be quickly defrayed by the larger rents an improved frontage would acquire. It may also be interesting to archaeological readers to know that the recent conclusions drawn by Mr. Penrose from the excavations have to some extent been modified by recent disclosures, and that that gentleman shortly hopes to solve in a more satisfactory manner the enigmas recently discussed in his paper read at the Institute, and to which we have referred.

HISTORY AND ÆSTHETICS OF ARCHITECTURE.—II.

ROMAN architecture, its development and characteristics, formed the subject of Mr. Statham's second lecture at the Royal Institution, delivered last Saturday afternoon. The buildings erected by the Romans were, the lecturer observed, more interesting from their historical connection than for their intrinsic architectural merit, inasmuch as they formed the great link between the Antique and Mediæval worlds. From an æsthetic point Roman architecture was far inferior to that of the Greeks. The chief traces of the origin of Roman architecture were found in the remains of that mysterious people the Etruscans, of whose art and life recent explorations had given us some idea. Amongst Etruscan remains had been discovered some of the same forms that existed in Egypt, from whence, perhaps, about 1500 B.C., art fashions seem to have spread over the civilised world. The resemblances between the smaller Egyptian and Tuscan temples were indicated by means of typical ground plans placed side by side; each, it was shown, consisted of three compartments, with internal pillars. The Etruscan mode of building was known not only from its monuments but also from the works of Vitruvius, an architectural writer who lived presumably about the Augustinian period, and from whose works we are able to reconstruct the Tuscan order with exactness, although not a single original building remained. In the Tuscan order might be detected an unmistakeable reminiscence of wooden architecture. The beam laid upon the columns was very thin, and those were slender in proportions for a stone construction, although excellently adapted for use in a wooden style. The architrave exhibited a

characteristic shallowness, and the order was almost devoid of ornament. A good example of revived Tuscan might be seen in the church of St. Paul, Covent Garden, originally built by Inigo Jones. Another feature of Etruscan architecture, which influenced that of Rome to the latest date, was the occasional employment of the circular form for temples, the round form usually being capped by a low conical roof. In some cases, too, tombs were built with the false arch opening only found in very early periods of art; an opening in which the stones were laid horizontally, but so arranged as to lap over more and more at each course, and thus form a triangular head, which had the appearance of an arch while constructionally it was not. In his former lecture, he had mentioned that the Corinthian order would be more correctly regarded as a Roman than as a Greek order, for it was but rarely used by Greek architects, its great development and fullest use being made by those of Rome. A very fine example of the order was the three columns still standing in the Forum of Rome, and now known as the remains of the Temple of Castor and Pollux, although for ages they were designated as part of that of Jupiter Stator. On comparing the order as developed in Rome with that of Greece a very important difference was apparent, and one which in principle distinguished the art of the two nations in every feature. This was the larger amount of surface ornament, and the want of constructional application in the volutes. They were by the Greeks brought under the angles so as to carry the weight; whereas the Romans turned them forwards, where they had no business to be, for the purpose of display. This want of skill and tact was also exhibited in the Ionic style. In Greece Ionic columns were only employed between pilasters, the reason being that they were intended to be seen from in front, where the delicate curves of the volute would appear most satisfactory; they would seem to add strength to the abacus, and were highly ornamental. The Romans used the Ionic column at angles and without pilasters, the consequence being that the volutes did not present an agreeable appearance when viewed sideways; they therefore twisted the volutes obliquely, so as to resemble horns, with the result of greatly detracting from their beauty and effectiveness. Another difference between the art of the two nations, in which the distinct inferiority of the Romans was apparent, was in their methods of decoration. He should have mentioned last week that it had been recently discovered that the Greeks decorated their principal buildings in colour—not in glaring primary washes over a broad surface, but in conventional patterns of repetition, applied in outline to the marble surfaces of frieze, architrave, and other parts of the temples. This subdued use of polychrome was not vivid enough for the Romans. They had no idea of subordination of parts and of decoration, no conception of the fact that a given ornament might be worth painting but not worthy of carving. They had enormous wealth and wished to display it, and so they cut ornaments upon their mouldings mechanically and in profusion. Greek ornament was an architectural intellectualism; that of the Romans was executed to display the means at the command of the builder. This was easily achieved; the whole building was covered with flabby ornaments, testifying to a good deal of work, but to very little taste or thought. The Greek artist seemed to have an intuitive perception of what was necessary to give a building its highest tendency; the Roman desired to put on the building as much costly ornament as he could. The constructional distinction between the architecture of the two countries was the introduction in Roman work of the arch. The Greek was exclusively a trabeated style; the principle on which its openings were formed was that of upright stones with a lintel resting upon them. Since the texture of stone is granular, this was the very worst mode of employing that material, as the lintel was subjected in the centre to cross strain, the force which it could least efficiently resist. On the other hand, it was a stable form of building, for if the stones could bear the weights resting on them, and were undisturbed, each triliton would stand to all time unsupported by its fellows. The Romans used stone in its strongest capacity, that of resisting compression, for their openings, building up the masonry in the wedge form of an arch. By this means, wider spaces were bridged over; but while the

arch could not fall inwards, it had the disadvantage of ever thrusting laterally, and frequently, from neglect of buttresses and foundations, the archespread outwards, and the building became a complete ruin. But the Romans, while building in an arched style, continued to imitate lintel construction, the simple reason why they did this being because they were stupid. When they put up a triumphal arch, as in that of Septimius Severus, they added to the faces of the piers columns, and architraves, friezes, and cornices, and since they found that the columns were supporting nothing, and that the arches did the duty, they brought out a section of the superposed architrave, frieze, and cornices over each column. They did not think about the reasons for their decoration, but regarded an order as a cheap way of getting "art." They ignored the fundamental rule in æsthetics that the external design should be the expression of the construction. Hence in the Baths of Caracalla as restored on paper by M. Viollet-le-Duc, there is a series of great arches enclosing a court, having a column attached to each pier and above it an architrave, frieze, and cornice, then a statue in a niche and another architrave, frieze, and cornice. If you visit Rome you will find that all these falsely-applied ornaments have fallen away, leaving standing the arches, in which you can see the cavities in which the column, statue, and horizontal members were fixed. That which was essential in the construction remains; the mere shams have perished. Still more extraordinary differences between Greek and Roman architecture were in the purposes and dimensions of their buildings. Greek remains consist almost entirely of temples, and only one of these was much larger than an ordinary parish church. They are executed in the finest materials, and are exquisite in workmanship; the architects seem to have put up a few ideal buildings. On turning to Roman works one sees a complete contrast. Their temples were comparatively small, but they had enormous buildings for public purposes, such as theatres and baths, as well as aqueducts and other engineering works; buildings of great size and many varieties, but no one of which would be regarded as perfect. The Greek buildings were but few and of one class, but these were of unsurpassed beauty. A typical Roman building was the Colosseum, which was almost exactly three times the size of the Albert Hall, and half as high again. It was decorated with the usual strings of columns, pilasters and orders, piled one above the other, and these illustrated one point wherein the architecture of Rome excelled that of Greece—viz., in affording the spectator an adequate impression of the size of a building. This was accomplished by a multiplicity of parts of similar scale. If a number of Greek temples were drawn of a uniform size, little difference would be found between those of the same order, except that in the larger examples subtle refinements of curves were introduced for optical effect, which were quite unnecessary in the smaller ones. This one point was better understood by the Romans. By using a series of uniform arches the impression was at once conveyed that a building was a great one. Again, the Romans were anxious to provide for cities ample supplies of water, and these were conveyed by means of aqueducts carried by arches across valleys. For these the columns and other applied decorations were discarded, and the result was that these were the most satisfactory of Roman buildings, as they alone exhibited a complete correlation between purpose, plan, and construction. The principle had its application at the present day. We were constantly building in imitation Gothic and bad Renaissance; but our engineers, when they were able to keep their hands from architecture and simply designed a utilitarian fabric, produced a genuine and therefore satisfactory building. Some time before the year 309 A.D. the Emperor Dioclesian determined to build a palace at Spalatro, and seems to have employed a clever architect to design it. It occurred to the architect that part of the Greek architrave might be treated as part of the arch, and it therefore followed the outline of the arch as a moulding, instead of being a distinct line above it, and this was one of the beginnings of a true arched style. He had alluded to the circular tombs of the Etruscans. The form was retained and developed for these monuments; very interesting examples being the tomb of Cecilia Metella, built about forty years before Christ, and that of another at Tivoli of about the same date,

erected on an Etruscan site. In the latter case, a tier of Composite columns surrounded a solid cella, or more properly a vault. In the Pantheon this circular form was rather developed, but the colonnade had entirely disappeared, and in the walls were discharging arches to carry the weight to the most stable part of the foundations; but carefully concealed, however, from view, as if the builders were ashamed of the constructional necessities of the fabric. The change of the seat of government from Rome to Byzantium had a lasting effect on the architecture as well as the history of Western Europe. In Byzantium the dome was gradually developed in character and importance, and adjuncts of aisles, transepts, and apses were added to the original cone. Having a round building, it was easy to add a domical roof; with the octagonal form it was still comparatively easy, the angles being corbelled over. But a square building presented a real difficulty to the architect. The first step was to make a strong central ring, resting on the walls at four points, from which the dome should spring. The angles were supported by throwing beneath each a segment of a subsidiary domical vault, and the thrust of these being adequately met, a firm basis was afforded for the dome. Mr. Statham announced that in his next lecture he should deal with the development of Byzantine into Gothic architecture.

THE ART OF THE ITALIAN RENAISSANCE.

ON Saturday afternoon Dr. Todhunter delivered the seventh of his course of lectures on the above subject, in the New Buildings, Trinity College, Dublin. The lecturer said that coming from Michael Angelo, the supreme sculptor of the Renaissance, to the Venetians, who in all the qualities of fine painting were its supreme masters, was like descending from lofty peaks to bask in pleasant meadows, and wander through enchanted groves. The first painter of the Venetian colour school to whom he would refer was Giorgione, whose very name sounded richly on the ear, and filled the eye of the imagination with a vague delight of gorgeous Venetian colour—that full-toned colour which glowed with the warm splendour of sunset or of a twilight soft as that which might fill the chambers of some palace of the genii, where the glare was mellowed through amber windows. But Giorgione was now little more than a name to conjure up pleasant dreams, a legendary personage whose works had perished from the earth to live only in the imaginations of men. All the frescoes with which he adorned the fronts of buildings in Venice were utterly gone with the exception of some very few mouldering fragments which still clung to the walls. But the impression which Giorgione produced upon the men of his time was shown by the multitude of imitators of his style. Some twenty painters set themselves more or less deliberately to paint pictures, which were easily mistaken for his. In Giorgione they saw for the first time a man whose art was almost divorced from religion, and who frequently painted subjects which were not even legendary or mythological, but simply ideal transcripts from the life around him. The beauty of life and the interest of everyday incidents were now at length recognised by the Venetians, and hence the crowd which pressed into the wide field opened by Giorgione. The influence of Giorgione was clearly visible in the works of several painters. With respect to Titian, he was as manifestly the representative Venetian painter of his day, as his master, Giovanni Bellini, was of his. Born about the year 1477, he seemed to have felt the glory of landscape scenery as probably no painter ever did before. He completed that fine treatment of landscape as something more than mere background which was begun by Bellini and Giorgione. In 1516, when he was thirty-nine years of age, Titian was fairly recognised as the great Venetian painter. He moved in the most cultivated society, and was in great request as a painter of portraits as well as of subject pictures. He lived to the age of ninety-nine. His long life had not the personal and political interest of that of Michael Angelo. He was the prosperous, aristocratic painter of a wealthy city whose national prosperity was at its height, while its spiritual decline had begun; and his art shared to some extent in that decline. In his works there did not appear the same undeniable advance from first to last as was observable in

Bellini's; yet up to his eightieth year he showed little signs of decline in skill. A picture which he painted for his own pleasure a few years before his death was hung up as a model of all technical excellence in the studio of Tintoretto. In the spirit of his works, however, a feverish inequality appeared. He became the flatterer of princes, and painted multitudes of pictures which pandered to the lower tastes of such men as Philip II. of Spain; yet, at the same time, he occasionally did magnificent things, and at his lowest was always a great painter. His portraits would always hold the very highest place, though he frequently flattered his sitters by idealisation, as in the case of the ugly, awkward, and sensual Philip, whose likeness, as put by Titian on canvas, won the heart of Mary of England. Titian's "Bacchus and Ariadne" was one of the greatest works of his best period. Any adequate description of it would require poetry rather than plain prose, suggested, as it was, by a poem of Catullus, and itself no doubt the origin of Keats' "Endymion." It was indeed quite in the spirit of Keats, classical in the sense in which his work was classical, steeped in the sunshine of Greek mythology, yet with a richness of tone which was essentially modern, and which was called Romantic rather than Greek. Ariadne, abandoned by Theseus in the island of Naxos, was portrayed as surprised by Bacchus as she stood gazing out to sea after the retreating sail. Bacchus in his chariot drawn by leopards, and surrounded by satyrs, appeared rushing out of a forest glade and flinging himself from his chariot in impassioned pursuit of Ariadne, who turned to fly at the first surprise of his sudden advent.

SCULPTURE IN GOLD AND IVORY.

AN interesting paper on "Sculpture in Gold and Ivory" appears in the *Magazine of Art* for May. We have, remarks the author, not so much as a fragment of any of these wonderful chryselephantine statues of ancient Greece remaining, nor have we more than scanty notices of how they were put together, and what they were like. The general tendency of modern theories leads to the conclusion that though the materials of which sculptors make use should be of fine grain and pure whiteness, such as Pentelic or Parian marble, yet that little reliance is to be placed on the splendour of mere material, and that the mind should be directed rather to the deep and imaginative beauty which the artist has embodied in his sculpture. Statues of gold and ivory are to some extent in contradiction to such teaching, true as it is when broadly stated. There were many of these chryselephantine statues in ancient Greece. The most famous were those of Zeus (Jupiter), at Olympia, of Here (Juno), at Argos, and of Athene (Minerva), at Athens. They were of colossal size. That of Zeus was from fifty to sixty feet high, on a pedestal of twelve feet. That of Athene was perhaps forty feet (twenty-six cubits). They have been described but vaguely by various authors—by Pausanias, who saw these as well as many others in the second century of our era. The faces, arms, legs, and all uncovered portions of the limbs were of ivory; the dresses which hung, in the case of the Athene, in straight but ample folds to the feet were of gold, the borders and edges were highly wrought. The Zeus sat in a chair (such, probably, as some seated statues in the British Museum are provided with) made with massive square bars and backs; at the four supports of which stood four Victories. In one hand he held a life-sized Victory, in the other a tall sceptre surmounted by his emblematic eagle. The sceptre was of various metals; the throne, or chair, was of cedar-wood, inlaid with ivory, ebony, and precious stones, and had on it figures and groups in relief. The footstool of the god stood on four lions, and the pedestal on which the whole was raised was covered with figures in relief.

The Athene in the Parthenon was standing. The face, arms, and feet were of ivory. The eyes were of marble, or *pietra dura*. On the head was a helmet, surmounted by a sphinx in the round, with griffins on either side in relief. Contests with centaurs were executed in relief on her Tyrrhenian sandals. She held a spear in one hand, and a life-sized Victory, considered a work of extraordinary beauty, in the other; and had a shield and a serpent at her feet behind her. She wore an aegis, or breast-plate of gold, on which was a Medusa's head of gold, replaced,

when Pausanias saw it, by one of ivory. The shield had the battle of the giants on the inside, that between the Greeks and the Amazons on the outside; and in this part the portraits of Pericles and Pheidias himself were ingeniously introduced. This fact led to a subsequent accusation of impiety. On the pedestal was the birth of Pandora.

The gold on these statues was hammered, and of no great thickness; said to be "a line"—perhaps as thick as the eighth of an inch. The throne of Zeus has been already said to have been of cedar. An olive-wood and cedar frame was the structure on which the Athene and other such statues were made up. There remain on coins various typical representations of the Zeus and of the Athene, and there are in the Museum of Naples, and the Vatican, antique statues considered to represent them (see "Museo Borbonico," vol. iv., plate 7, for instance), and the Pallas of the Villa Albani. A bust of Zeus, with huge locks of hair, in the Museum of Naples, is also considered to represent the head of the colossus at Olympia. All the great artists who were contemporaries or pupils of Pheidias worked at the statues we have described, or took special parts, such as the inner and outer sides of the shield, the sandals, pedestals and so on. The golden drapery of the Athene seems to have been so laid on that it was movable; at any rate, the artist had it taken off and weighed when accused of peculation. The entire weight of gold was about forty talents, and the value in our money was about £120,000 sterling—a great sum in those days.

The question will naturally be asked, how such surfaces as a face nearly five feet high—or in the case of the seated Zeus twice as large—the arms, and limbs, could possibly be made of ivory? The material was laid on olive-wood, and was probably glued down with excellent animal size (in the opinion of De Quincey, pegged down to the wood). However large the teeth at the artists' command, the pieces must have been joined. The ancients are said to have been acquainted with methods of softening the edges and joining together slices or slabs of ivory something in the way in which tortoise-shell is still joined. Oil was constantly rubbed or poured over the Zeus to preserve the ivory, and the vapour of water had a similar effect on the Athene in the Parthenon. It must be remembered also that, in consequence of the immense scale on which these statues were made, the lines or cracks that might be seen on small carvings close to the eye would not be generally perceptible. There remains one more question regarding these sculptures: was the ivory left white or painted? We know that the architecture, probably also the sculpture, of the Parthenon was painted and gilt. Were not most of the statues of the Greeks painted also? If the eyes of the Athene were inlaid in marble, or lapis-lazuli and other stones, was her face left without colour? We have no definite information on this point, but there is some probability that even the ivory may have been treated with colour laid on with size or wax. Such a treatment would tend to preserve the material, and we know that these large statues remained entire in the second century of our era, and were probably, not taken to pieces till the fourth.

The example set by the artists of the time of Pheidias was followed in a number of sacred places in Greece, and it became a sort of fashion to have such statues in the rich temples of the Roman dominions. Numbers are said to have been made in Athens, Corinth, and other wealthy Greek capitals, for exportation long after the loss of Greek independence. We must not omit a notice of an effort, the only one that can be mentioned in modern times, to revive this costly kind of sculpture. The late Duc de Luynes had a statue of ivory, silver, and bronze, a Minerva, made by a French sculptor, M. Simart. It was exhibited in Paris in 1855. It measures nearly 10ft. in height. The face, neck, arms, and feet are of Indian ivory, as well as the torso of a small Victory held in her right hand, and the Medusa's head on the aegis. The spear, shield, helmet, and serpent are of bronze; the drapery and the aegis, or breast-plate, are of beaten silver, carefully chased with the graver.

We have no record of any similar attempt during the Italian Renaissance, that period so fruitful, not only in excellent sculpture of bronze and marble, but in the production of carved ivory,

CUR COMMONPLACE COLUMN.

GRANITE: DURABILITY AND USE.

IF the granite contains much quartz it will be hard to work; but unless the felspar is of an inferior kind it will weather well. The *potash* felspar is more liable to decay than the lime and soda felspar (*allogelase*). Mica is a source of weakness. If there is an excess of lime, iron, or soda in the mica or felspar the granite is liable to decay. *Working*.—The smaller the grains the better is the granite for building purposes, as the more easily can it be worked. Mr. Wray in his work on Stone, says, "In using granite for ornamental purposes the coarser-grained stones should be placed at a distance from the eye, the finer grained stones where they can be easily inspected. Without attention to this point very little better effect is produced than by a stone of uniform colour." For plinths, copings, architraves, and public doorways, and for those parts and structures exposed to rough usage or wear granite is a valuable material. For engineering purposes it is a most useful material for bridges, piers, quay-walls, paving, &c. The surface of granite is entirely destroyed by the effects of fire. *Varieties*.—The Scotch granites from the neighbourhood of Aberdeen are highly esteemed; the best known are those from Peterhead, Rubislaw, Stirling Hill, Dalbeattie, Ross of Mull, Kennay, Kinsteary, &c. The Devonshire and Cornish granites have not so good a name. Guernsey granite is chiefly used for paving purposes. See "Notes on Building Construction," Austed's "Practical Geology," and our own articles on "Architectural Geology."

Granite is a silicious stone of a highly crystalline structure, consisting of grains irregular in appearance and variable in composition. The principal ingredients are quartz, felspar, and mica, combined with hornblende and other minerals. When the felspar is present in large and distinct crystals, it is termed porphyritic; when the mica is replaced by hornblende it is termed syenitic granite. The colour of granite—usually red or grey—depends on the ingredient that predominates; the prevailing tints—either white, red, or brown—are due to the nature of felspar present. *Uses*.—The density and hardness of granite render it difficult to dress; its use is, therefore, chiefly confined to the facing of important buildings, and for bridges, piers, aqueducts, docks, &c. Durability, being the most important consideration, will depend (1st) on the quantity of quartz present in the stone, the quartz being imperishable; (2nd) on the nature and quantity of felspar; this mineral sometimes decays very rapidly on exposure, forming a kind of white clay used in making porcelain ware; (3rd) on the proportion of mica present, being easily decomposed when present in large quantities. Iron, when present in any quantity, also causes stains, &c. When the crystals of the various minerals are small, hard, compact, and well diffused, with a bright surface, the stone is usually found to be durable. Generally speaking, granite shows no planes of stratification, and can be worked equally in any direction. When granite is used for ashlar, it is more economical to have it dressed at the quarries; the stone becomes harder when exposed to the air, therefore easier to dress when freshly quarried. The workmen are more accustomed to the work. The superfluous material being cut off, the stone is lighter, saving carriage, its hardness preventing clipped arrisses when ordinary precautions are taken during removal. The chief supplies are obtained from Cornwall, Devon, and Cumberland; Aberdeen and Inverness, in Scotland; the Wicklow and Mourne Mountains, in Ireland; the islands of Guernsey and Jersey.

"J. D. B." sends the following notes: Chemical composition of ordinary granite is generally as follows:—

Silica	72.3
Alumina	15.3
Alkalies	7.4
Lime, magnesia, and iron ..	5.0

100.0

This rock consists generally of about 40 per cent. of felspar, 30 or 40 per cent. of quartz, and from 10 to 20 per cent. of mica. Specific gravity of ordinary granite is 2.66, a cubic foot weighs 166.2lb., and a cubic yard as nearly as possible 2 tons, about twice weight of cubic yard of coal. Granite contains about 0.8 per cent. of water, and is still capable of absorbing $\frac{1}{4}$ more, or about

0.2 per cent. This water is contained in minute cells in the quartz. In specification say "no rusty veins," these are of iron, and so rust and leave crack. On the Continent granite frequently appears, St. Petersburg being largely built of it; the largest block at St. Petersburg as pedestal of Peter the Great's statue 50 cubic yards of material. Granite not decomposed by acids, and only imperfectly and slowly calcinable at a great heat. Some say carbonic acid in rain water decomposes felspar, thus leaving mica and quartz without any cementing material. China clay or kaolin said to be decomposed granite.

GRATES.

A good grate, in which economy of heating is aimed at, should be shallow in depth, about 9 inches at the bottom, sloped upwards. It should not be so low as ordinarily seen in some fashionable patterns, but at least 9 inches from hearth. The principles of construction have not been discussed with greater ability than when Comt Rumford wrote upon the subject, though numerous claimants have appeared. The principles then inculcated in respect to the form of the sides and back and the use of fire-clay have been adopted by a score or more of manufacturers of late years with undoubted results. The ventilating stove is the outcome, but it is unnecessary to name the numerous varieties and patents before the public, all of which have some form or other of heating chambers or air flues, either behind, or at the sides, or both, by which the air, admitted direct from the outside, becomes heated and is allowed to escape at the sides or above the grate. We may mention Sylvester's, Dr. Arnott's, the "Galton" stoves as exemplifying the principles that have been aimed at by various makers of grates. Fire at both their backs and sides is universally adopted. A length of bar equal to 1 inch for every foot of length of room, and the height $\frac{1}{2}$ inch for every foot of breadth of room, is a useful approximate rule for size. The "Manchester," Messrs. Barnard's, and other forms of slow-combustion stoves noticed in our pages are recommended. (See our advertisement pages.)

GREEK ARCHITECTURE.

As to the origin of Greek architecture it undoubtedly owes much to Egyptian and Asiatic influences, the earlier types being corrected by the laws of æsthetics. Greek architecture passed through four phases. First, the timber was only material of construction, whether we accept or not that "the Doric triglyphs represent the ends of beams scored with grooves for ornament." In the second phase wood covered with metal was chiefly used. This is undoubtedly of Asiatic origin. Then stone, including brick, tufa, and granite. And lastly, marble was their chief material. The three styles in which Greek architecture developed itself are the Doric, Ionic, and Corinthian (see articles under respective titles). The Doric is considered by some to have passed through six phases, the first or proto-Doric dates anterior to the seventh century B.C., and the last belongs to the fourth century (see metope in the Schliemann col., S. Kensington Museum). The chief characteristic of the Doric order is its proportion, its massiveness suits it particularly for its object, the square abacus forming an easy support to the entablature. If we accept the general law that an object is most æsthetic when best suited to its end and purpose, the Doric order is then the most artistic. The Ionic order is chiefly characteristic of symmetry. The volutes are of Egyptian (or Assyrian) origin. The Corinthian order is distinguished by its curiitany. The foliated capital is a development of the Egyptian lotus capital. If viewed strictly the Corinthian capital is a breach of the laws of æsthetics, for drooping leaves can never suggest support. It must be noticed that the deity to whom the temple was dedicated greatly influenced its style or mode of building. Temples dedicated to Zeus, and to male deities in general, were heavy, solid, and plain. Those dedicated to Athene and other goddesses were light, elegant, and highly decorated. This is not a passing fancy or mere sentiment, but an actual fact, which only requires careful observation to be verified. The architecture of Greece was essentially public, and hence they possessed no domestic architecture (we speak of Greece in her ascendancy and golden age). "Such was the spirit of patriotism that the richest citizens did not endeavour to exceed others in the magnificence of their houses or tables, but employed their wealth for the security and defence of their country, and in

raising noble buildings and works for the service of religion, and in honour of public and private virtue."—C. F. W.

GRANGE.

"C. F. W." sends the following notes:—A grange, according to Prof. Parker, is a farming establishment, especially such as belonged to a monastery. From M. Viollet-le-Duc we learn that they were originally built by the monks, usually within the precincts of some abbey. They were very numerous and well-built. Some of them still remain in the Ile de France, Normandy, Champagne, Touraine, dating from the 12th and succeeding centuries. Their plan is usually of three parallel lines, divided by two rows of pillars, which support the heavy framework of the roof. They were sometimes protected by watch-towers, and were inhabited by serving-monks and peasants. They then had certain dwelling-rooms, and here any benighted traveller could find a lodging. By degrees these granaries or granges were grouped around the dwellings of the peasants, and thus became the origin of hamlets. In times of danger the peasant betook themselves to this inclosure, and were thus better able to defend themselves. These monastic granges were often destroyed by neighbouring rival abbots. These granges sometimes contained stables with a vast loft or granary above. There is one of this kind still remaining at St. Martin au Bois (Oise).

GREENHOUSE.

A greenhouse is a house with glazed roof and sides in which plants are kept in pots; it is generally built on the ground floor, either attached to the house or disconnected. The flower-pots are usually placed on wooden stages in the centre, on shelves along the side, or upon the brick casing the pipes or flues. Greenhouses, unlike hot-houses, are intended for the plants of climates only a little warmer than our own. A temperature of from 45° to 50° only is necessary, and this may be attained by a smoke-flue or hot-water pipe. The best aspects are south and south-east, the north is the worst. The great object in construction should be to allow the plants to catch the rays of the sun, and this may be done by fixing the shelves so that they may follow the slope of glass roof. The reader is referred to the works of Paxton, London, and others for details, also to our own pages.

CHIPS.

A National Exhibition of Ecclesiastical, Architectural, and Decorative Art will be held, under distinguished patronage, at Swansea, in October next.

The Annual Congress of the Social Science Association, to be held at Manchester, will open on October 1 and close on October 8.

Mr. Alfred Robinson, Church and Art Furniture Manufacturer, has removed from 173, High Holborn, to 54 and 55, Broad-street, Bloomsbury.

On Tuesday week the new schools erected by the West Bromwich School Board were formally opened. Theschools and class rooms, with offices, will accommodate 250 boys, 170 girls, and 200 infants. They are Gothic in style. The work has been successfully carried out by Mr. Henry Smith, of West Bromwich, from designs of Mr. John Loxton, architect, Wednesbury, and the cost, including site, furniture, fittings, &c., will be between £6,000 and £7,000.

A new Wesleyan chapel at Stannington was opened last week. It is cruciform in plan, the length being 53ft. and the width 31ft.; the transepts are 20ft. wide and 10ft. deep; the height from the floor to the springing of the roof is 18ft., and to the centre portion 21ft. It is designed in the Romanesque style. Accommodation is provided for 200 adults and 200 children, and total cost has been £1,500. The work has been carried out from the plans of Mr. H. W. Lockwood, architect, of Sheffield.

St. Peter's Church, Pickering, the restoration of which is nearly completed, under the direction of Mr. J. S. Crowther, of Manchester, will be reopened on the 10th of June.

A new Congregational church at Tunstall is completed. The building is calculated to seat from 450 to 500 persons, and the cost of the erection when quite finished will be between £1,400 and £1,500. We may add that the contractor for the erection is Mr. Yorke, of Tunstall.

Lord William's Grammar School at Thame founded in the reign of Queen Elizabeth, was opened on the 1st inst. in new and substantial school premises erected from the designs of Mr. Williamson, of Oxford. Messrs. Taylor and Grist, of Birtton, near Aylesbury, were the contractors, and Mr. Burton was the clerk of works.

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ILLUSTRATIONS.

CARLYLE HOUSE, CHELSEA EMBANKMENT.—TWO ITALIAN TOWERS.—NEW DIVINITY SCHOOLS, CAMBRIDGE.—BRIDGE OVER THE RIVER LUNE.—"BUILDING NEWS" CLUB DESIGN FOR A COTTAGE HOSPITAL.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CARLYLE HOUSE, CHELSEA.

THIS detached mansion, our view of which is reproduced from that in the present R. A. Exhibition, has been erected on one of the most interesting sites of the Victoria Embankment, Chelsea, forming part of a block of west-end houses recently erected adjoining the Botanical gardens belonging to the Apothecary's Company, commanding an extensive view of the Thames, and being immediately opposite Battersea Park. The style is "Queen Anne," and the front has been executed in red brick, with rubbed and gauged mouldings, and carved panels, the back elevation being in stock work, with red brick dressings and mouldings. The plan has been most carefully considered with view to convenience and comfort, introducing every modern improvement in ventilation, warming, and prevention of sound, special attention being paid to the drainage, which has been laid outside the house. The plumbing work has been executed upon a system found to be the most perfect after many years' experience and study of the subject by the architect. The whole of the waste pipes are entirely separate from the soil pipes, the supply of cold water is filtered before leaving the cistern, and there is a separate supply for the supply of the water-closet apparatus. Full control over the pipes is given by stopcocks in case of frost. The house is warmed by means of coils of hot-water pipes placed in the vestibule, hall, staircase, lavatories, and the large fernery or conservatory, adjoining the boudoir. The heat at each coil can be readily regulated by gun-metal screw valves. These coils are heated from a boiler of the most sure and improved make placed at the base of the back staircase, with the several floor and return pipes traversing the basement corridors, thus warming the air, and encouraging a draft up the back staircase, at the top of which is fixed one of Hill and Hey's ventilators. Each room, with the exception of

one or two of minor importance, has a separate ventilating flue, built between the flues from the fireplaces, but in no way connected with them, and a special ventilating flue is provided from the kitchen. The water-closets are also ventilated. A complete system of hot-water supply is carried out from the kitchen (which is one of Hayne's improved projecting closed range and hot plate combined) to the hot closet on the third floor, with branches to the two baths, nursery, scullery, housemaids' closet, lavatories in bed rooms, with shampooing apparatus, lavatories on the ground-floor, and also to the butler's pantry. One most important feature in the house is an improved hydraulic lift, the first of its kind erected in England. This has been fixed from the basement to the third floor, acting as a passenger or luggage, as well as a dinner lift, the apparatus of which is perfectly safe, and so simple that the most inexperienced person can use it at any speed desired, without the slightest danger, and the cost of the water for its use is only about £5 per annum, a constant supply being laid from the company's main. The principal staircase is constructed of pitch-pine from ground to second floor, and a second staircase connecting the suites of bedrooms on the second and third floors, and from the third floor to attics, also a back staircase of stone from the basement to the third floors communicating with each landing. A billiard-room is formed under the schoolroom, with a private staircase from the principal staircase. In the rear of the house, a complete block of stable buildings for the accommodation of four horses, and standing room for three carriages, with residence for coachman, has been erected, the entrance to which is in Queen-street, but so arranged that while they form a picturesque object from the back of house, they do not in any way interfere with the clear view over the garden, from which they are entirely shut off, a private door only being provided from the garden. The stables are built upon the most approved plan, and with the latest improvements in fittings, &c. A washhouse and laundry have been formed in the stable buildings, fitted with large washing trays, supplied with hot and cold water, and all necessary fittings. The laundry is supplied with a hot closet, and galvanised iron drying-horses, large ironing-stove, with hot-water apparatus complete. The mansion has been carried out from the designs and under the superintendence of Mr. A. Croft, Messrs. Gillo, of 176, Oxford-street, being the builders.

TWO ITALIAN TOWERS.

VITERBO is a very picturesque city, and full of interesting subjects for sketching. It is celebrated for fountains, and there are many external stone stairs to the houses, of great beauty. It is a hilly place, and the campanile of S. Giovanni is down in a hollow, and was sketched from a place above the church. There is a good campanile to the Cathedral, somewhat like this one, but larger. Prato, a small town between Pistoja and Florence, is best known for the very fine frescoes in the choir of the Cathedral by Filippo Lippi; there are also some by Agnolo Gaddi, a good circular pulpit by Rossellino and Mino da Fiesole, and outside is the pulpit with Donatello's dancing children at the angle of the building. The campanile was sketched from the cloisters of the church to which it is attached, but I do not know the name of the church.—P. J. MARVIN.

NEW DIVINITY AND LITERARY SCHOOLS AT CAMBRIDGE.

THE late Professor Selwyn founded a fund for the erection of a Divinity School at Cambridge, for which the University purchased a site opposite the front of St. John's College, and having a considerable frontage towards the open space of ground known as All Saints Churchyard (the church had been removed some time since). This site being of more than adequate size for the Divinity School, it was decided to erect upon it certain lecture-rooms for the literary professors also. Three architects, all graduates of the University of Cambridge, Mr. A. W. Blomfield, Mr. Gilbert Scott, and Mr. Basil Champneys were invited to send plans in competition, and the plans of Mr. Champneys were selected. The contract was undertaken by Mr. J. Loveday, of Kibworth, near Leicester, for the sum of rather less than £12,000, exclusive of fittings. The warming arrangements are by Mr. D. O. Boyd, of Maddox-street, Regent-street.

The clerk of works is Mr. W. H. Williams. The material is red Woolpit bricks, made of a special size, to work four courses to 9in. The stone is Douling, with Ancaster stone for the tracery and finer work. The building was commenced in May, 1877, and is now nearly completed.

BRIDGE AT UNDERLEY PARK, WESTMORLAND.

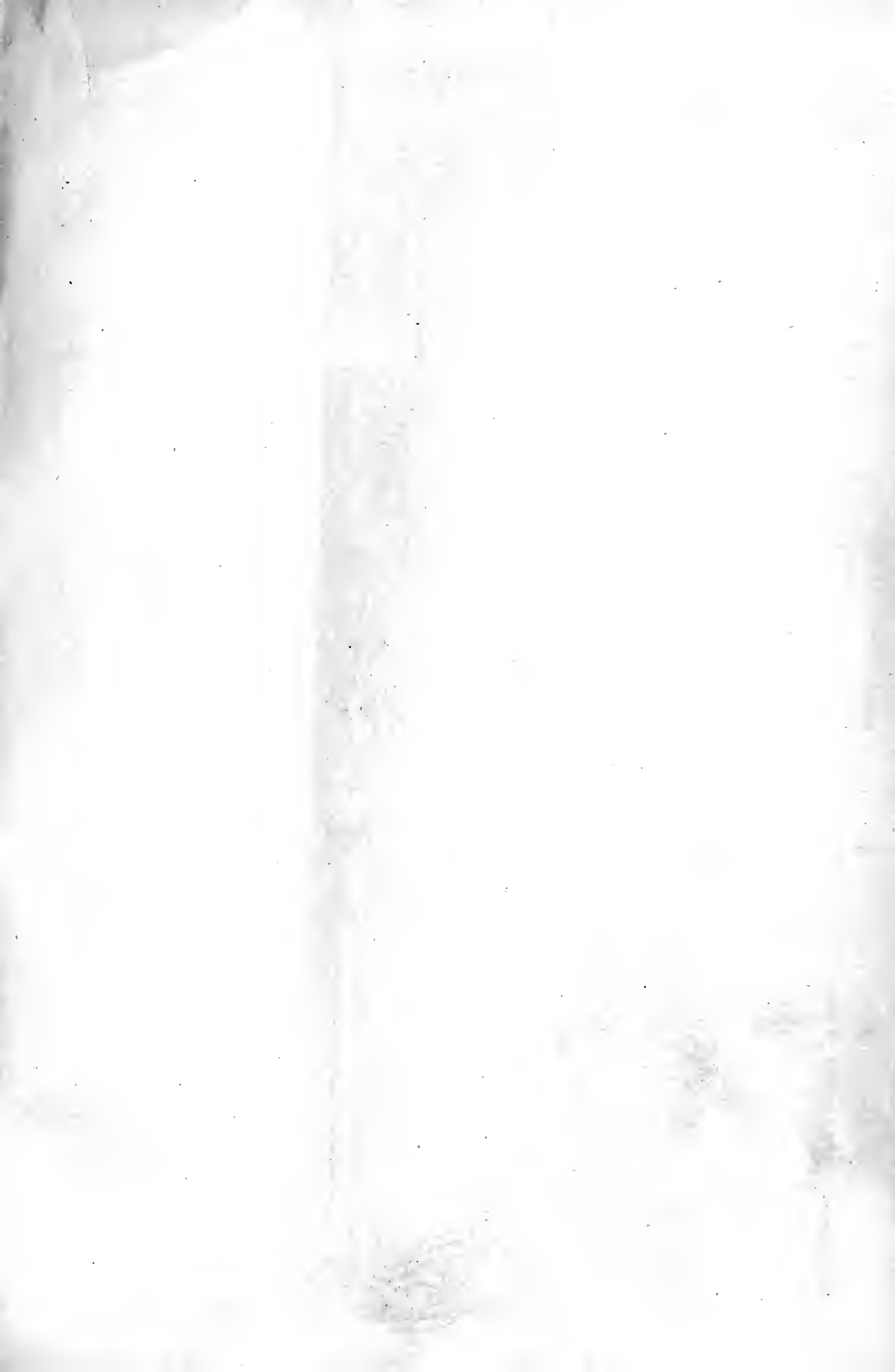
THE accompanying view represents the bridge recently built over the river Lune, at Underley, in the Luncedale, the seat of Earl Beattie, M.P., being part of other extensive improvements on this estate. The bridge is built of light-coloured freestone from Docker Moor, some portions in red stone from Fearth. It has two segmental arches of 70ft. span, and rise of 13ft. 6in., and a land arch of smaller size. The arch soffits are formed of bold ribs, somewhat in the style of the ancient bridge at Kirkby Lonsdale. The wide span of the arches was almost necessitated to avoid the building of piers in the river, the bed being merely shifting and loose gravel to a great depth; indeed, the building of the single pier in centre and land pier proved a work of great risk and expense, the dams and piling being frequently carried away by the floods. The elements were most unpropitious throughout, the river frequently rising 14ft. or 15ft. in a day. The work was carried out principally by Earl Beattie's workmen, under the direction of Mr. P. Leitch, clerk of works, and Mr. Crittenden; the centreing by Mr. Geo. Bush, of Preston. The architects are Messrs. Brade and Smales, of Kendal.

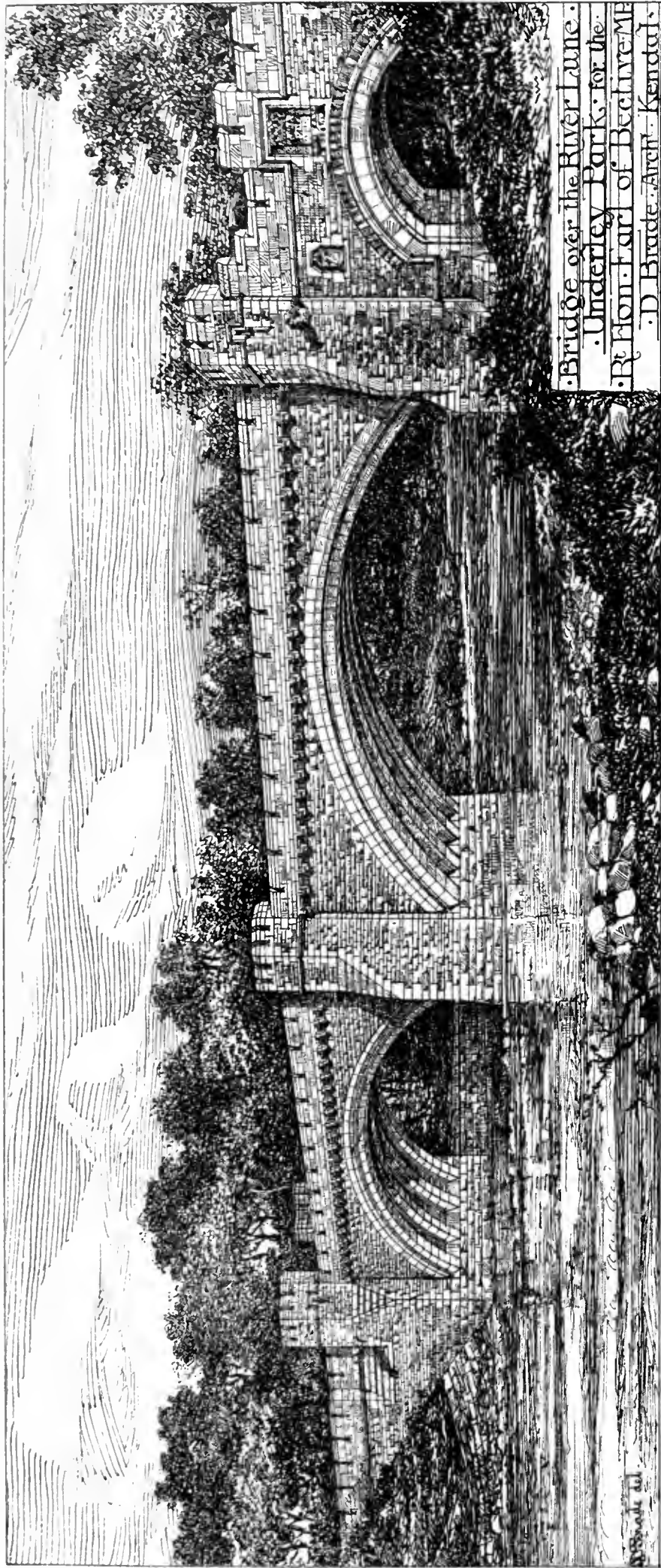
"BUILDING NEWS" DESIGNING CLUB—A COTTAGE HOSPITAL.

"TRIANGLE IN CIRCLE" is the motto adopted by the author of the design placed first in the competition among the members of our Designing Club for a cottage hospital, and we publish his drawings this week. We have already remarked upon this and the other designs, none of which can well be considered as really good examples of hospital placing, though the selected design has some suggestive points both in the plan and elevations.

PUBLIC WORKS IN FRANCE.

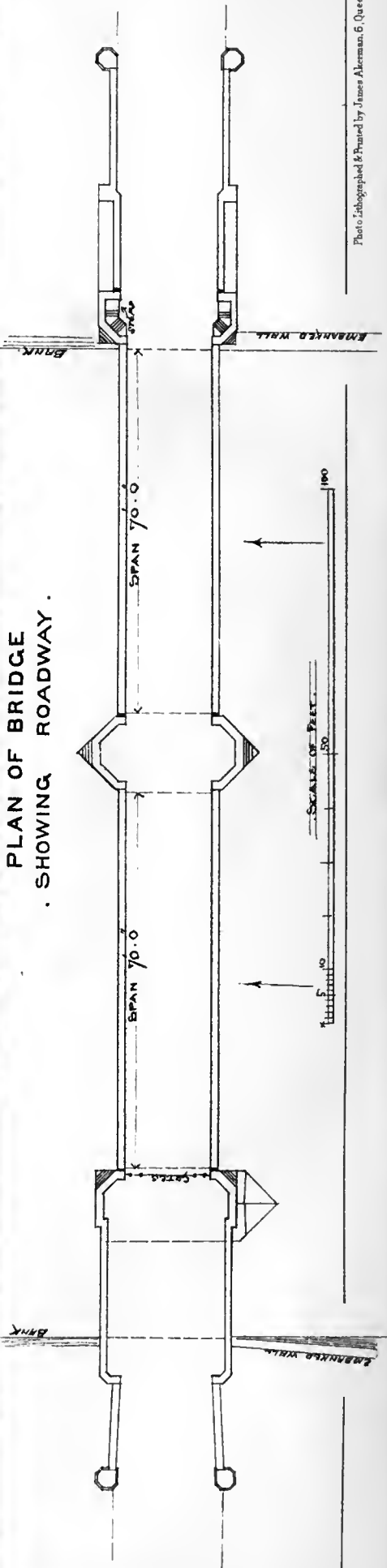
FRANCE, though she has her share in the general stagnation of trade, is occupied with gigantic projects for public improvements. M. de Freycinet, the Minister of Public Works, has outlined a scheme of railway, canal, and harbour extension, for 1879, which will cost the enormous sum of £16,000,000,000, and will probably have legislative sanction for it in its entirety. One of the main features of the plan, and that which will consume the greater part of the vast appropriation, is the extension of the railroad system of France. The rest of the money will mainly go to the construction of new harbours and the improvement of the old ones. Another great public work which is urgently demanded by several of the departments is a canal from Creil-sur-Oise to Beauvais, Amiens, and Albert, with two important branches. It is averred that this extensive canal would be of the greatest value to the north of France; and it would certainly be the most considerable of all navigable French waterways, and would have the effect of reducing by one half the present freight charges from English ports to Amiens, Paris, and beyond. A scheme for the construction of a network of metropolitan railways in Paris was hardly perfected before M. de Freycinet stepped in and claimed the perfected lines as belonging to the category of lines of general interest. Their concession has therefore been transferred from the Municipal Council to the general government. The cost of their construction is estimated at nearly a million dollars a mile. The Minister of Public Works has also obtained the appointment of a supreme commission on the treatment and utilisation of French rivers, composed in equal thirds of legislators, officials, and manufacturers or agriculturists. It will consider irrigation, motive power, inundation, water supply, sewage, and similar questions. Add to all this his vast project of harbour improvement, and we see that M. de Freycinet has laid out a scheme of public works for France which will occupy the Republic for many years to come, constituting a system of internal improvements of extraordinary magnitude, which, if it is successfully completed, will itself make the new Republic memorable for generations.



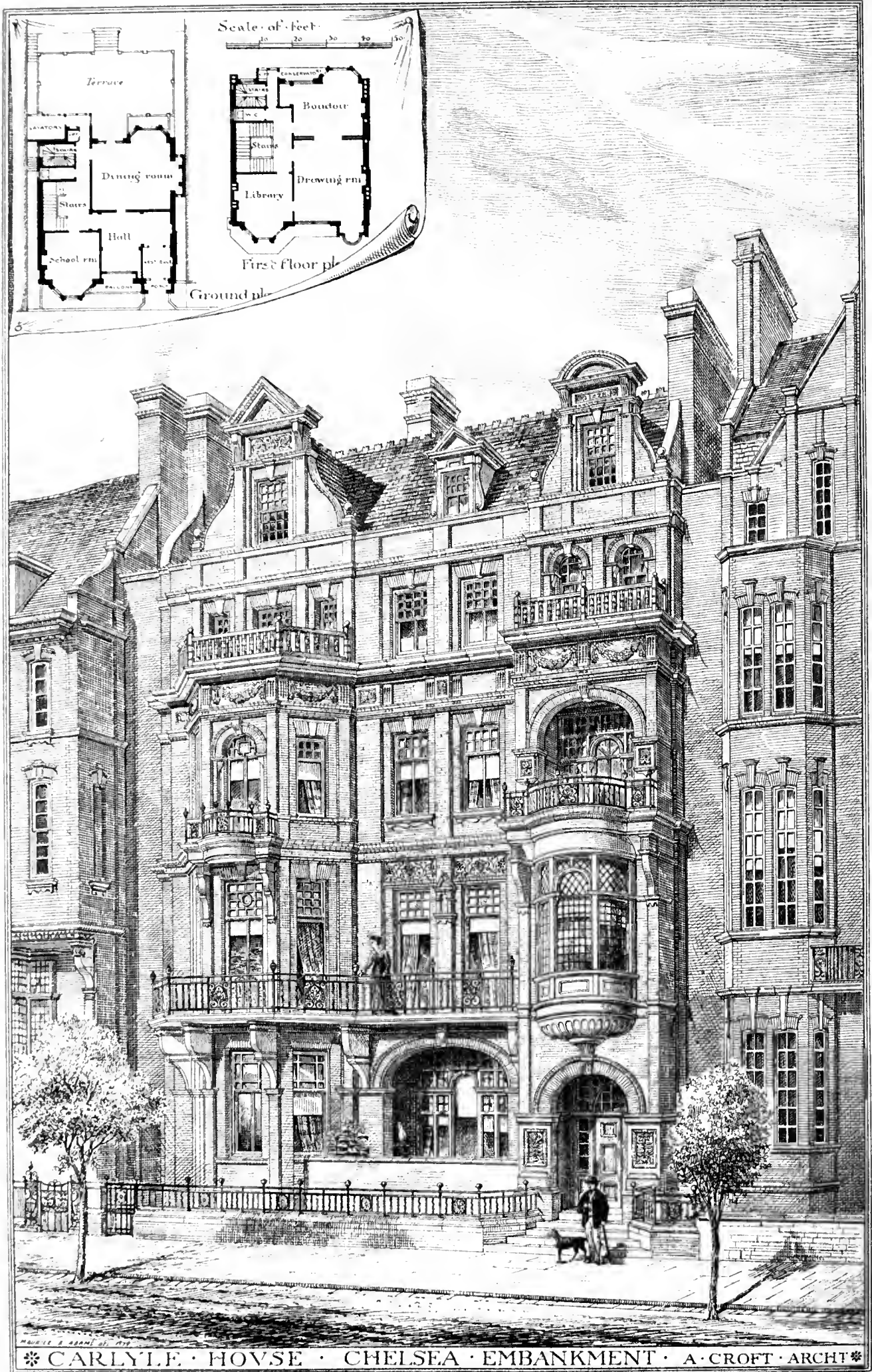


• Bridge over the River Thames.
• Underley Park, for the
• Rt Hon. Earl of Bechewme.
• D. Brade Arch. Kendal.

PLAN OF BRIDGE
• SHOWING ROADWAY •



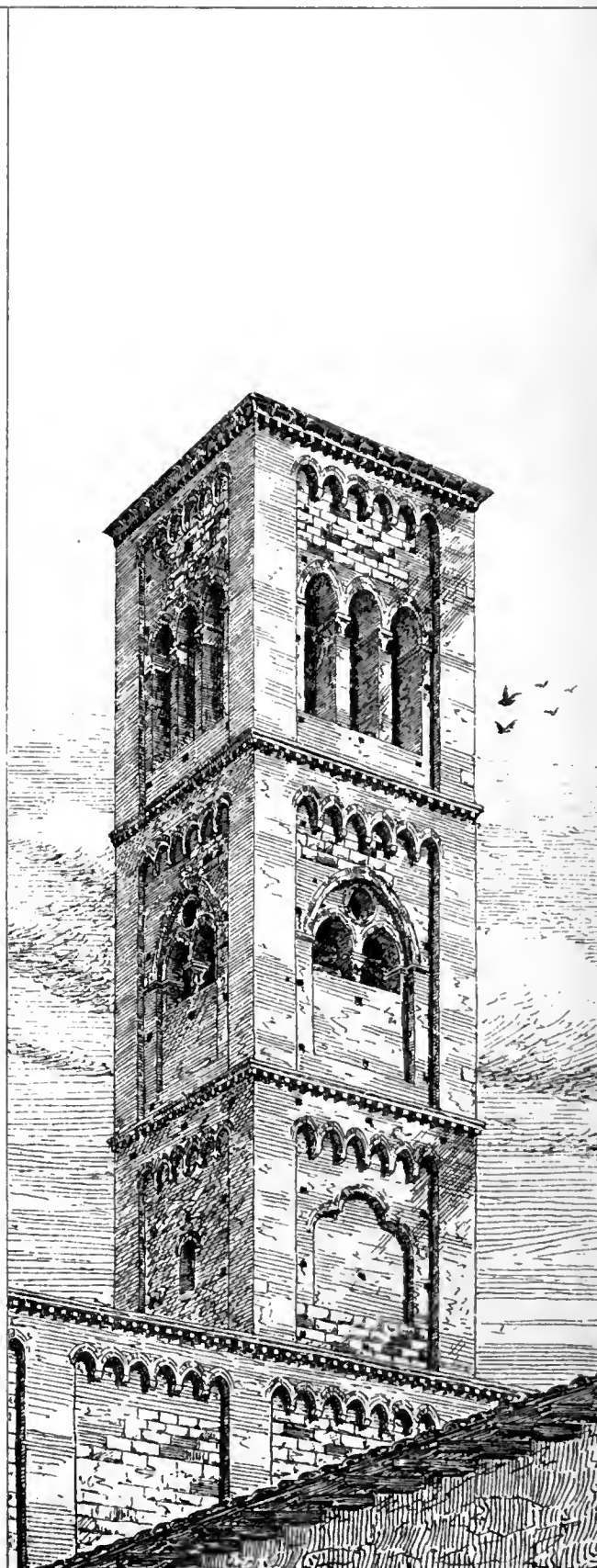
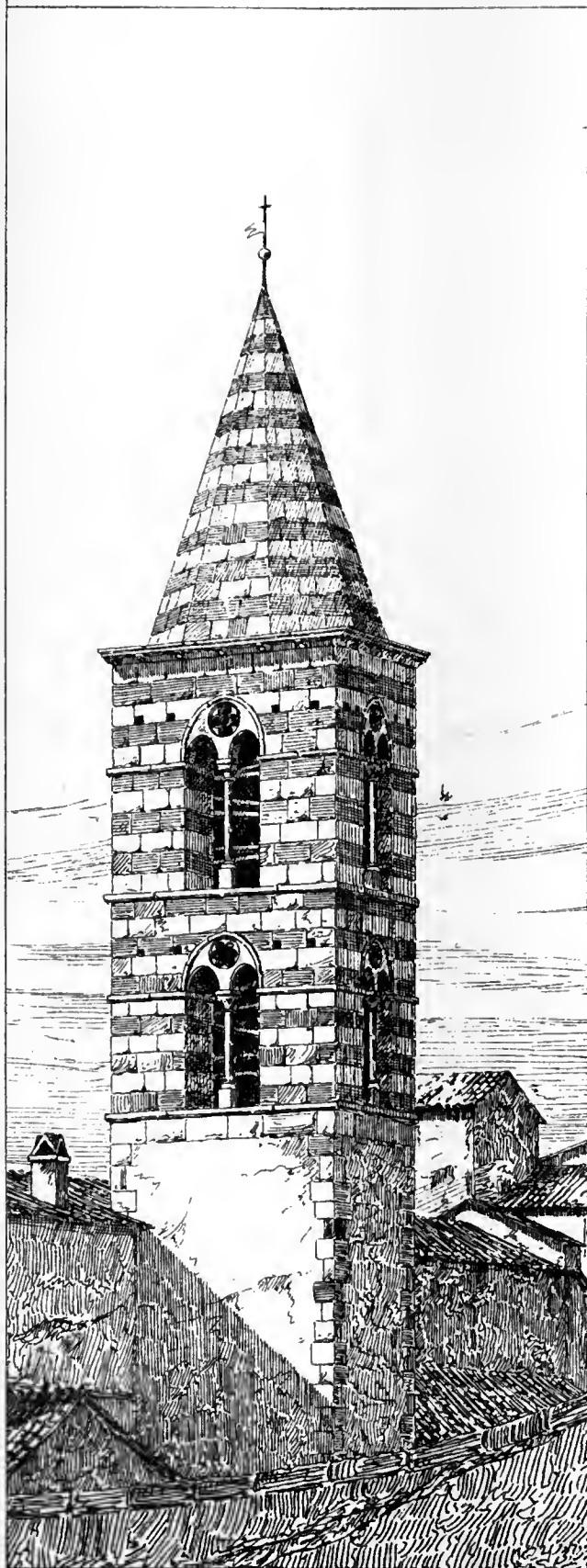




* CARLYLE HOUSE • CHELSEA EMBANKMENT • A. CROFT ARCHT *

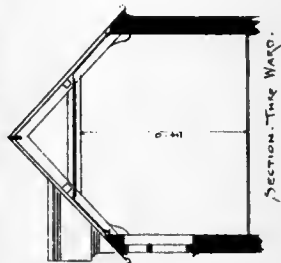
TWO ITALIAN TOWERS
S-GIOVANNI, VITERBO. PRATO N^R FLORENCE

DRAWN BY P.J. MARVIN ARCHT



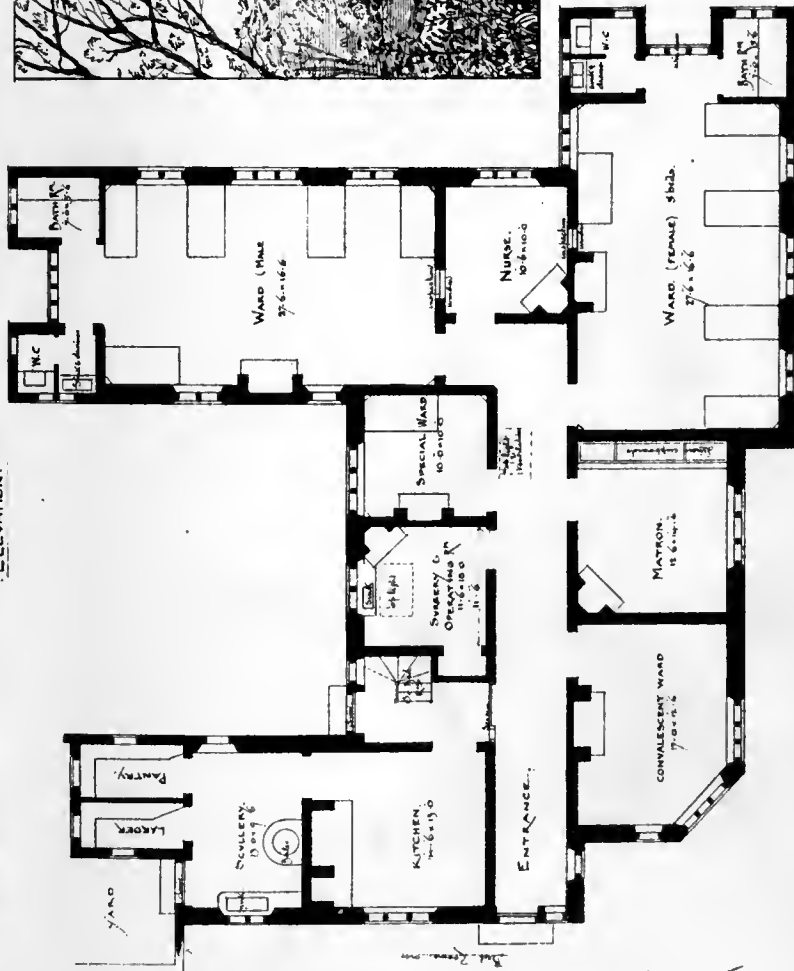


"BUILDING NEWS" DESIGNING CLUB

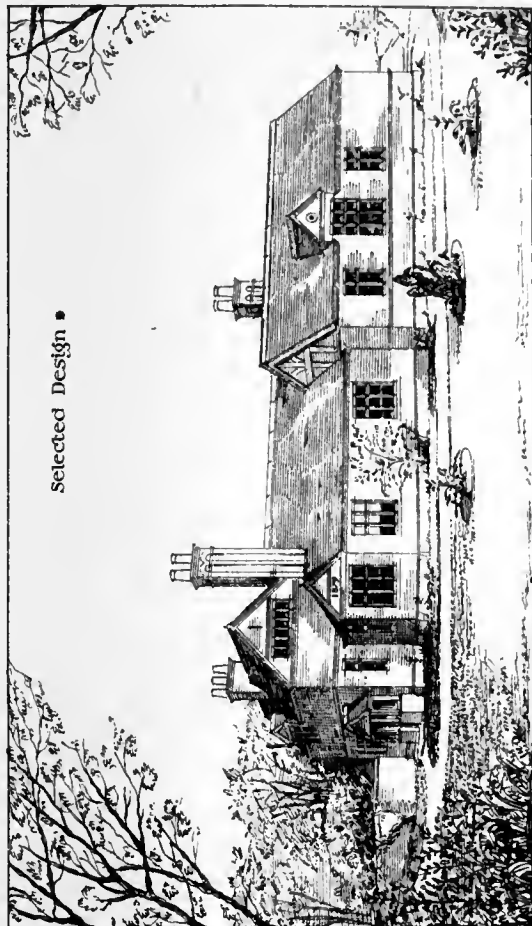


SECTION-MAIN WARD.

ELEVATION:



GROUND PLAN.



Selected Design.

- A COTTAGE HOSPITAL -

Artificial Ventilation - Fresh air admitted partly by
by opening ventilators & partly by use of
Manchester gas in fireplace.
Fresh air admitted by Boyle's ventilators placed
near ceiling & connected with combined smoke &
ventilation flue.



Scale of feet.



THE SOUTH TRANSEPT OF YORK CATHEDRAL.

AS this beautiful portion of the noble cathedral of the northern archiepiscopate is occupying our attention, having for some years been in the hands of Mr. G. E. Street, R.A., undergoing a thorough restoration, it may not be out of place to note that the Rev. Canon Raine, of York, in compiling his "Lives of the Archbishops of York," a work of great research, gives some valuable information respecting this particular part of the cathedral. It appears to have been built by Walter de Gray, archbishop 1216 to 1255, a scion of a family which in many branches has accumulated both wealth and honour, one that has given great men to England and is still represented on the roll of Peers. Of the many scenes enacted in the time of this martyr bishop, that of his attendance upon King John at Runnymede in connection with the signing of Magna Charta is conspicuous, as is the influence he lent towards the passing of the "Charta de Jurista." In connection with the high offices he held it may be noted he was at one time Lord Chancellor, and at another the Regent of the Kingdom during the king's absence at the wars in France. One of his acts was the purchasing of a large property in London, whereon he erected a palace for the northern primates. This was known until Wolsey's time as "York Place," from which time it was called Whitehall. As the work of this great primate the beautiful west front of Ripon Cathedral may be mentioned. With regard to York Cathedral, our author says: "Gray's noblest work was the erection of the south transept, in which he was interred. It is the choicest portion of that glorious temple, and the Early English style of architecture may there be seen in the supremacy of its beauty. In boldness of arrangement and design, and in richness of decoration, the south transept is without a peer. How many of those who gaze with curious and admiring eyes upon arcade and carving, are ignorant of the piety and merits—nay, of the very name—of the prelate who called them into being more than six centuries ago?"

As to the exact date of the erection of this beautiful work, Canon Raine says:—"From the fact that Gray granted an indulgence for the church of York in 1227, and that several other gifts were made about the same time, it may reasonably be inferred that the building of the transepts was then going on. That on the south side must have been completed before 1241, the year in which Gray founded his chantry at the altar of St. Michael. The north transept, which is ascribed to John Romanus, senior, was probably built shortly before Gray's work. It is less rich, and probably, therefore, of an earlier date. Romanus became sub-dean in 1228, and died in 1256."

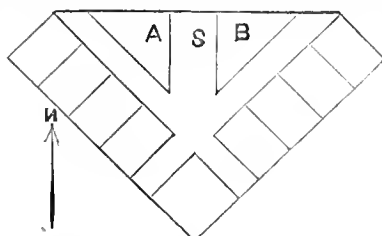
The altar of St. Michael here alluded to was erected in a chapel formed in one of the bays of the eastern aisle of this transept, and in this chapel Archbishop Gray was buried. Professor Willis, in his "Architectural History of York Cathedral," says:—"The pier arch under which the tomb stands is made wider than the others, apparently to give it importance." This, it is assumed, was so made that the founder might rest beneath it.

This celebrated tomb, illustrations of which have been given in this journal, to use the words of Canon Raine, "is one of the most striking memorials of the age in which it was set up. The Archbishop, who seems to have been of small stature and a slight frame, is stretched out at full length, with his pastoral staff in his hand, which is thrust into the mouth of the serpent. The details of the figure and its adjuncts are full of simple elegance. Above the sleeping prelate, on ten light and graceful pillars, there towers a magnificent canopy, which terminates in finials of the most beautiful design. Many will be surprised to learn that these are of modern workmanship, and that they were moulded less than a century ago by an Italian of the name of Bernasconi, a sculptor of great merit. I cannot bestow too high praise on what he has done, for he seems to have been imbued with the true spirit of Christian art. He has crowned each finial with two thrushes in full song, wrought with exquisite skill, and resting upon woolpacks. These finials are, it may be noted, of plaster." In "Drake's Eboracum" (427) there is an engraving of the tomb before Bernasconi meddled with it; and this author mentions a curious story which was believed in

his day, that the Archbishop had died under a sentence of excommunication, and that his body, therefore, was not laid in sacred earth, but in the canopy over the pillars. The too curious antiquary made an incision into the stonework, and soon found that there was no hollow within.

HOSPITAL PLANNING.

IN a recent number of the *American Architect and Building News*, Mr. M. Carey Lea, of Philadelphia, comments on the present systems of hospital planning, and offers a plan, which is annexed, wherein he has endeavoured to attack the difficulties of hospital construction in a new manner. The building has a somewhat triangular shape, and the wards all face either south-east or south-west, so that they all receive ample sunlight, and in summer get all the breeze that is to be had. The principal staircase is marked S. In the space marked A are intended to be placed the baths and water-closets on each story; also the store-rooms. In the space B is placed, on the ground-floor, the kitchen; on the second floor, the apothecary's shop; on the third floor, the operating-room, for which, with its north light and sky-light, it



is particularly well adapted. "I am aware," says Mr. Lea, "that those architects whose main object it is to produce a showy building will object to the fact that the face on which the main staircase opens is not terminated by right angles. If this objection is insisted upon, it can be met by sacrificing a ward in the centre of one of the square sides, and treating that side as the main front of the building. I have preferred, however, to draw the plan in the manner that gives the greatest possible advantage to the interior. Inspection will show that excellent ventilation is obtained by the halls, which cross each other at right angles; so that in whatever direction the wind may come, these halls, opening south-east, north, and south-west, must carry air through the whole building. The triangular spaces on each side of the main staircase, the shape of which would be objectionable for wards, are perfectly well adapted for the uses assigned to them."

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE annual general meeting of the Institute was held on Monday evening, Mr. Charles Barry, F.S.A., President, in the chair. The secretary read a letter from Mr. S. W. Kershaw, M.A., stating that in consequence of the increase of his duties at Lambeth Palace Library, he felt it necessary to tender his resignation as librarian of the Institute, an office he had held for eleven years, and which he relinquished with great regret. Mr. Octavius Harsard proposed a vote of thanks to Mr. Kershaw for his lengthened and valuable services, and referred to his assistance in the enlargement and rearrangement of the library. The motion was seconded by Mr. Joseph Clarke, and supported by Mr. Wyatt Papworth and Professor Donaldson, the last-named speaker observing that Mr. Kershaw, though not an architect, had largely acquainted himself with architectural literature, and had discharged his duties at the Institute in an admirable manner. Mr. Kershaw briefly responded, acknowledging the compliment paid him.

In reference to the forthcoming International Exhibitions to be held at Sydney and Melbourne, the PRESIDENT read a letter from the Prince of Wales, dated April 21st, in which His Royal Highness, as President of the Royal Commission for the Australian Exhibitions, requested the members to lend their assistance in promoting the success of these exhibitions, and asked the President of the Institute to bring under their notice as soon as possible the desirability of securing such an exhibition of drawings as will

maintain the reputation of British Art at these exhibitions, where the artists of Italy, France, Germany, and Belgium will be well and largely represented. The exhibition at Sydney will be opened on September 1st next, and all objects intended for it should be despatched not later than the first week in June. It is proposed that at the close of the Exhibition in Sydney, the drawings should be transmitted to Melbourne for the Exhibition which is to be held therein the following year. The PRESIDENT said that as only three or four weeks remained in which to prepare for this exhibition, it was hardly practicable to appoint an executive committee; the council would, therefore, exercise their functions in this matter. The machinery which was in use for the Paris Exhibition would still be available; the drawings intended for the Paris Exhibitions could be received at South Kensington as before; that the Commissioners of the New South Wales Government undertook the cost of collecting, and packing in cases lined with zinc, the exhibits; while the Commissioners appointed in London would effect insurances to cover all risks from the time the pictures were obtained till the time they were returned. It was further proposed that the drawings, after they had been exhibited at Sydney, should be sent on to Melbourne under arrangements of precisely the same character. In a conversation which he had on the subject with the Prince of Wales the other day, His Royal Highness intimated that the architectural works sent to Paris, together with others that might be produced, would in his opinion be suitable for exhibition in Australia—for as very few Australians were able to go to Paris, they would be new to them, and might satisfactorily be exhibited as illustrations of British art.

The PRESIDENT read a special report, prepared by the Council, as to the Premises Improvement Scheme. It recounted the proceedings taken by them, the appointment of Mr. C. J. Phipps as paid architect, and the various plans made by that gentleman in order to meet the requirements of the members, especially in the matters of improved lighting, ventilation, and access to the meeting-room, increased library accommodation both for books and readers, better office, tea-room, and lavatory arrangements. The plans were considered more expensive than could be warranted by the present financial resources of the Institute, and it was deemed necessary to confine the operations to such improvements as the premises at present occupied by the Institute are capable of within themselves. The Council, therefore, were prepared to recommend as follows:—1st. To retain the present meeting-room, but to obtain better daylight by greatly enlarging the windows; better ventilation to it, for evening meetings, by the construction of an efficient extracting shaft; and to alter the seats, and provide tables, &c., so as to afford good accommodation for readers at all times, except during the twelve or fifteen nights a year when it is used for sessional meetings, when the benches could readily and quickly be arranged for that purpose. 2nd. To construct a broad new staircase without winders, and secure a private entrance to the Institute rooms, so as to make them self-contained. 3rd. To form a separate outer office for clerks, instead of the Council-room being the only room for the secretary and the clerks, as is now the case,—an arrangement obviously of the greatest inconvenience. 4th. To obtain better and larger lavatory accommodation. 5th. To obtain for the nights of meeting a more commodious tea-room and cloak-room. Plans were submitted to the meeting embracing these objects, and which, it was estimated, might be executed for about £1,200; while a further £800 would suffice for the new and increased fittings, extra furniture, &c., or a total of £2,000. The Council had therefore negotiated (subject to the approval of the general body) a new lease for 79 years from the Architectural Union Company at an increased rental of £100 a year.

After some discussion, Mr. EDWARD T'ANSON suggested that the meeting should express an opinion as to the desirability of carrying out the large or the small scheme sketched in the report read by the President, and it was resolved:—"That it is not at present expedient to appropriate the upper rooms of the building (9, Conduit-street, W.), but that it be referred back to the Council to re-arrange the entrance, the staircase, and the first-floor rooms in the best manner which can be devised, and to carry the same into effect."

The Hon. SECRETARY called attention to the inexpediency of binding the Council not to take any portion of the upper floors with a view to improving the ventilation of the meeting-room, and it was ultimately resolved:—"That the Council be not restricted to avoid any interference with the upper floors, but that, if an additional area can be there obtained of moderate extent, they have power to negotiate for the same with a view to improve the ventilation, and make the required arrangements relating thereto with the Architectural Union Company; and further, that the Council be empowered to surrender the present lease of the premises, and to make the necessary arrangements for executing a new lease with the Architectural Union Company."

The Report of the Council for the official year, 1878-79, having, according to precedent, been taken as read, was received, and along discussion followed in which Messrs. C. F. Hayward, T. Blashill, C. H. Cooke, G. E. Street, Joseph Clarke, W. Papworth, and C. L. Eastlake took part. The Report, 1879, and the Balance-Sheets, 1878, were then adopted.

The following gentlemen were elected to the offices of President, Vice-Presidents, Secretaries, and other Members of Council, for the year terminating on the first Monday in May, 1880:—President, John Whicheard, F.S.A.; Vice-Presidents, Thomas Hayter Lewis, F.S.A.; Horace Jones, and Edward Middleton Barry, R.A.; John Macvicar Anderson, Arthur William Blomfield, M.A., David Brandon, F.S.A., Arthur Cates, Ewan Christian, Joseph Clarke, F.S.A., Henry Currey, John Gibson, Octavius Hansard, John Honeyman (Glasgow), Edward T'Anson, F.G.S., John Loughborough Pearson, A.R.A., F.S.A., George Vulliamy, Alfred Waterhouse, A.R.A., and Thomas Worthington (Manchester); Honorary Secretary, Thomas Henry Wyatt, F.S.A.; Secretary, William Henry White. The above form the Council. Sir Walter Rockliffe Parquhar, Bart, was re-elected Treasurer, M. Frederic Ouvry, as Solicitor, and Messrs. W. A. Boulnois and F. T. Dollman, were elected Auditors.

The following gentlemen were elected to serve on the Board of Examiners (appointed under the Metropolitan Building Act, 18 and 19 Vict., c. 122, s. xxxiii.) for the year of office 1879-80: George Aitchison, Francis Chambers, Charles Fowler, Charles Forster Hayward, Edward T'Anson, Joseph Jennings, Robert Kerr, James Thomas Knowles, Joseph Douglass Mathews, Henry Parsons, Frederick William Porter, Thomas Roger Smith, Sancton Wood. Votes of thanks were passed to the retiring president, and to the council, the treasurer, the solicitor, and outgoing auditors (who were re-elected), for their services during the past three years.

A special general meeting was held at the close of the annual meeting, Mr. C. Barry, Past President, in the chair, when the By-law (4) referring to the Declaration required to be signed by an Honorary Associate was amended, thus:—"Honorary Associates shall be persons, *not following the profession of an architect, but interested in the study of architecture, who, by their connection with art or science, are qualified to concur with architects in the advancement of professional knowledge, and who are unconnected with any branch of building as a trade or business.*"

THE ANTIQUITY OF ENGINEERING.

IN a paper read recently before the Engineers' Club of Philadelphia, Mr. George Barnham, jun., remarked that modern research has developed the fact that nearly all the materials (in a very wide sense of the word) of modern civilisation originated in antiquity; the peculiar province of our time being to ring the changes of variety upon these elements and give them an immense diffusion. The ancients originated nearly all the typical forms we now employ. They were acquainted with the constructive uses of wood; carried stone construction to a point that we have never since reached, and probably never shall; their brick-work dates from the very earliest times, and they constructed canals and aqueducts for irrigation, water supply, and inland navigation, as well as elaborate drainage systems, long before their civilisation culminated. The Chaldean structures dating from 2290 to 1500 B.C., were built of small sun-dried bricks, laid in bitumen, and faced with kiln-dried bricks

stamped with the name of the king. These temples were built on elevated platforms of beaten clay, in some instances eased with massive walls of stone, the object being to raise them above the level of the plain for architectural effect and to avoid inundation. A brick burial-vault at Mugher exhibits a rudimentary arch. The vault is 7ft. long, 5ft. high, and 3ft. 7in. wide. The sides slope gently outward until the springing line is reached, when the successive courses are pushed towards each other until they meet at the top. Similar arches are found in early Greek work at Phigalea, Messene, and other places.

The old notion that the round arch was of Roman and the pointed arch of Gothic origin has been dissipated by the spade of the archaeologist. Both of these varieties were found in Assyrian work. They are usually of brick, and occur in underground construction, as drains and vaults. The brick arch existed in Egypt as early as 1540 B.C., and a stone arch has been found dating from 600 B.C.

The masonry of the past is, of course, identical with ours, since we have simply adopted the methods of the ancients. We find in Egypt and Western Asia smooth and rock-faced ashlar, rubble, and irregular range work, essentially like that of to-day. The Assyrian and Egyptian bas-reliefs indicate their methods of moving heavy masses. Sledges were used, drawn by large bodies of men. Rollers were placed under the sledge, and the piece was carefully "guyed" by parties of men with appropriate ropes and props. The Roman military roads crossed mountains and valleys without regard to the nature of the ground; tunnels, open cuts, embankments, and bridges frequently occurring. Place cross-ties and steel rails upon a Roman road, and suppose the grade not too steep, and the points of approach and divergence of modern and ancient engineering are at once apparent. Substantially the substructure was the same as that of a modern railroad; but in place of the pedestrian or the ox-team we have the locomotive, with its "fast express" or heavily-laden freight train.

THE YORKSHIRE FINE ART AND INDUSTRIAL EXHIBITION.

THE Yorkshire Fine Art and Industrial Exhibition was formally opened on Wednesday, at York. The plans and specifications of the building have been prepared by Mr. E. Taylor (the architect of the Exhibition Building of 1866), and the foundation-stone was laid on the 22nd April, 1878. The building consists of two portions; the first a stone and brick erection, containing on the ground floor a spacious vestibule opening into a central lecture or concert hall, 98ft. by 38ft. On either side of this hall there is a suite of rooms specially arranged for the exhibition of works of art, being lighted from the roof. This double suite of rooms gives about 200ft. by 30ft. available for hanging paintings, &c. Ascending a wide staircase of stone the principal picture gallery (which is over the vestibule, &c.) is reached. This is a noble room of 100ft. long by 30ft. wide, and is at the present moment filled by the finest collection of paintings that has been seen in York. It is hoped that in this gallery there may ultimately be placed a permanent collection of works of art, the property of the city, which shall give to the Yorkshire art student some of the advantages of the Metropolitan. The Great Hall.—This is 200ft. long and 90ft. wide, having galleries running down each side 20ft. wide. In the gallery at the extreme end, and above the spacious orchestra, is the organ purchased by the committee. The floor of the great hall and its galleries are filled with a display of manufactured goods, embracing almost all departments of trade, the exhibits in the furniture and furnishing departments being specially important. To the west of the great hall is the machinery annex, covering an area of about 25,000 square feet, and glazed by Mr. T. W. Helliwell, of Brighouse, with about 11,000ft. of his patent system of roofing. In this many very interesting manufactures and processes are going forward, the motive power being a powerful steam-engine, and one of Crossley's "Otto" gas-engines. Adjoining the great hall on the eastern side is a spacious lecture-room, where from time to time exhibitions of views by the lime light and the chromatic fountain will

take place. The total cost of the building will exceed £24,000.

COMPETITIONS.

IPSWICH.—Mr. Charles Barry has been requested to report upon the twenty-two plans submitted in competition for the new post-office and public buildings at Ipswich.

PARLIAMENTARY NOTES.

LEADENHALL-MARKET AND IMPROVEMENT BILL.—The Select Committee appointed by the House of Commons to inquire into the merits of this Bill assembled for the first time on Tuesday; Lord Henry Lennox in the chair, the other members of the committee being Mr. Dundas, Mr. Cotes, and Mr. Fremantle.—Mr. O'Hara, who appeared with Sir Edmund Beckett, Q.C., and Mr. Digby, opened the case for the promoters of the Bill in the absence of his leader. He pointed out that the Bill was for the abolition of the present Leadenhall-market, for the improvement of its site and neighbourhood, for the formation of new streets, and for the establishment of a new market. The market was one of great antiquity, having been always the property of the Corporation, and had been under the control of the Markets Committee of the Corporation. He pointed out that in 1871 an Act was passed which empowered the Corporation to enlarge the poultry market, but for several reasons it was desirable that that Act should now be repealed in favour of the present Bill. The proposal of the Corporation now was to make a new market, which should give a space considerably larger than the present market, and which should be a great improvement, from a sanitary point of view, upon some part of the site which it was proposed to take, although they did not wish to be tied down as to the exact mode in which the market should be built. The market expenses would be paid by the Corporation out of their own revenue, and for that they did not require the consent of Parliament. Mr. Shaw, Chairman of the City Lands Committee of the Corporation, was examined in support of the project. The Committee adjourned.

LONDON-BRIDGE BILL.—The Select Committee of the House of Commons appointed to inquire into the merits of this Bill, for the widening of London-bridge and its approaches, assembled on Tuesday, Lord Henry Lennox in the chair; but upon the Bill being called on there was no appearance, and it was understood that the opposition to the Bill in its present stage had been withdrawn. It will, therefore, come before Mr. Raikes, Chairman of Ways and Means, as an unopposed measure.

ARTISANS' DWELLINGS ACT (1868) EXTENSION BILL.—Mr. McCallagh Torrens on Wednesday moved the second reading of the Artisans' Dwellings Act (1868) Extension Bill. Its object is to amend that Act, mainly by restoring to it the compensation clauses, the omission of which by the Lords has made it entirely inoperative. Mr. Isaacs, who had given notice of his intention to move the rejection of the Bill, withdrew his amendment on the understanding that amendments would be introduced in Committee, and Sir H. Selwin-Ibbetson signified that the Government would assent to the second reading, though they were of opinion that the clauses would require careful consideration in committee. Sir M. Ridley said the Home Secretary heartily approved the Bill, and wished it to be known that within three years all the sites cleared in the metropolis would be covered by artisans' dwellings. Mr. Goldney, Sir J. M. Gaskell-Hogg, Sir S. Waterlow, and Mr. Marten spoke in favour of the Bill. Mr. Bruen approved its extension to Ireland, and Sir J. Kay-Shuttleworth expressed a hope that something in this direction would be speedily done for the small towns and rural districts, and the Bill was read a second time.

The Church of St. Peter, Great Totham, near Maldon, Essex, was reopened on Thursday, the 1st instant, after restoration at a cost of £2,000. Among the special features beyond repairs may be noted a new pulpit of open oak on stone base, chancel fittings in oak, and new font. In the chancel a south window has been filled by a figure of St. Peter in stained glass. The two cracked bells in the tower have been replaced by a peal of six new ones, cast by Messrs. Warner and Sons at a cost of £300.

Building Intelligence.

BAWBURGH, NORFOLK.—The restoration of this parish church has been partially carried out from the designs of Mr. Ewan Christian. A new open-timber roof of Memel fir, covered with Staffordshire tiles, and with a stone-crested ridge, has been placed over the chancel, and a new stone coping and cross added to east gable; all the stonework repaired. The internal face to the chancel walls has been stuccoed, and the floor has been laid with Minton's encaustic tiles; a new door and carved benches, all in oak, erected. One of the small windows on south side has been glazed with painted quarries; the other three windows and the large one at east end have been filled with tinted cathedral glass. The porch has been re-roofed with stained open timber and repaired. The much dilapidated floor of the nave has been taken up, the surface concreted and relaid, and the monumental slabs and brasses replaced. The contractors were Messrs. Cornish and Gayner, of North Walsham.

BELFAST.—The new buildings for the General Assembly's College at Belfast are steadily progressing towards completion. They consist of a chapel, president's house, two dwelling-houses for professors, and an addition to the students' chambers. The outside walls of these buildings are being built of cut stone from the Scrabo quarries, with a moderate amount of carved work at windows and doors. As to the elevation, it has been designed to be in keeping with the present building, the main lines of string-courses and cornices of the present building being carried round the new portion. The addition to the students' chambers is at the end of the present building, to which it is similar. Accommodation for twelve additional students will thus be provided. The two houses for the professors are not being built in the college grounds, but are closely adjoining, and have all the necessary accommodation for a family. They are semi-detached, and are built with red brick, with terra-cotta and cut stone string-courses. Mr. Lanyon is the architect, and Messrs. John Lowry and Son the contractors. The buildings, which will cost about £10,000, will be completed about the end of the present year.

BIRMINGHAM.—The ornamentation of the new Council Chamber has been completed by the erection of a Riga oak screen in the recess at the back of the Mayor's chair. The screen is in five panelled compartments, divided by coupled pilasters, having richly carved floriated capitals. Each compartment is subdivided into a series of nine panels, with the exception of the centre, which has only one panel, and has on each side circular columns. The panels are filled with Italian walnut, carved in fruit and flowers, with birds and snakes. The centre compartment, projecting 3ft., forms a sort of canopy for the Mayor's chair, and upon the panel are carved an hourglass, surmounted by the motto, "Tempus fugit." The pilasters support a cove filled with green stamped leather, and having ornamental brackets carrying the projecting gallery front, the pilasters of which correspond with those of the screen. The central portion is raised and is circular in form, the arms of the borough being set in a laurel wreath of Italian walnut. In the centre the screen is 17ft. high, and the width is 26ft. The Italian walnut used for the carved panel is cut from the largest log which has ever been imported, and was brought to this country twenty-five years ago. The wood is very hard, and the carving is well executed. The makers are Messrs. Collier and Plucknett, of Warwick, who also furnished the Council Chamber, the designs being supplied by the architect of the building, Mr. Yeoville Thomason.

CHELSEA.—St. Mary's Roman Catholic Church, Cadogan-street, Chelsea, was opened on Thursday week. Externally of a plain character, in the Early English style, the new church consists of a nave and aisles, chancels, three side chapels, a porch, and baptistry. It has a great western doorway over which are four lofty lancet windows of equal length, giving the principal light to the church; but the ordinary entrance will be from a side doorway on the north side, opening into a spacious porch taken off from the aisle. Opposite this porch is the baptistry, a distinct gabled erection at one end of the south aisle and opening into the church by a double archway. The interior of the church is 115ft.

long by 57ft. wide; the nave is 82ft. by 27ft., the chancel 35ft. by 21ft., and the aisles 15ft. wide. The roof is a plain wooden barrel vault of cream tint, slightly painted, relieved by moulded ribs (or principals) and rafters painted of a bluish green. The chancel roof is varied by being composed of a series of eaves, the springing ones being stilted. The church is built of white stocks, with stone dressings, while Hopton Wood and Corsham Down stone has been used in the interior, and the chancel is completely faced with ashlar of this material. The architect is Mr. J. F. Bentley, of John-street, Adelphi, and the works have been carried out by Messrs. Braid; Mr. Spooner being the clerk of the works under the architect. The important frontage of church, convent of Our Lady of Mercy, house for Christian Brothers, and extensive school for boys and girls, with the almshouses, occupy a space of 350ft., and are nearly opposite the mansions now being erected on the Hans Estate. We fully described the church, which is undoubtedly one of the most successful erections of its kind, in the BUILDING NEWS of Feb. 14, p. 168.

CITY OF LONDON.—The Church of St. Katharine Cree was reopened on Sunday, after internal restoration, carried out at a cost of £3,500. The pews have been cut down from the old "omnibus" form into low, open benches. A large unsightly partition has been removed from the western entrance, giving additional space within the church. The old windows have been taken out, with the exception of a memorial one above the Communion-table and one in the south-eastern clerestory, and have been replaced by others of simple pattern in double-glazed to exclude noise. The stove, with its huge chimneys, which disfigured the south-western windows, has been disestablished, the warming being now effected by a modern heating apparatus. The south-eastern pier has been rebuilt, and all decayed timbers cut away and replaced. The whole interior has been decorated in colour. The ceiling is in pale grey, with rings of buff colour, picked out with vermilion and gilding; in panels are the arms of the sixteen leading livery companies, emblazoned in their proper colours; the cost of this portion of the work has been defrayed by the several companies interested. The walls are of a dull chocolate tint, and the columns have been cleansed and left in the natural colour of the stone. The architect is Mr. R. P. Notley, of Gracechurch-street, E.C.; and the builder, Mr. F. T. Prebble, of Camberwell.

DONNINGTON.—The parish church of Donnington, near Altringham, was reopened on Tuesday week, after partial restoration, under the direction of Mr. Norton, Mr. Martin, of Hereford, being the builder. The work was begun in June, 1878, but some delay was caused by its being decided to substitute local grey and red stone for Bath stone in the work. As the work progressed it was found that the roof of the nave was in such a bad state of repair that its removal had to be added to the work begun. The crowning difficulty which the rector and the restoration committee had to contend with was the fall, or rather total collapse, of the tower, which took place on the 25th March last. The tower had been an anxiety all along, being considerably out of perpendicular before the work of restoration was begun, iron cramps having been used to hold it together for many years past. When the west wall of the church, which was also the east wall of the tower, came to be overhauled in the course of the work, it was found to consist of rubble, and to be in a very dilapidated state, requiring to be rebuilt, the top of the tower having to be propped up. On the 25th of March a new lancet window was about to be put in on the south side of the tower, when, without any warning, except a few showers of sand and rubble, it collapsed, and lay a heap of ruins, with its roof of wood and felt lying on the top—a shapeless mass of sand, rubble, and small stones, the larger stones belonging to the upper part. The lower part of the tower was evidently weak and badly built, and was undoubtedly crushed by the upper part.

EARLEY.—St. Bartholomew's Church, Earley, was consecrated on Wednesday week. It has been erected from the designs of Mr. Waterhouse, A.R.A., by Messrs. Stephens and Baston, builders, Bristol; Mr. F. W. Barr being clerk of the works, and Mr. W. Young foreman. The church as at present built consists of nave and north and south aisles, and will seat 600 persons. The materials used are red and grey brick,

with open roof and other timbers of unvarnished pitch-pine. The columns of the arches separating the nave from the aisles are of granite, with Douling stone capitals and bases. The total cost of the church as now built is £3,600, including extras; but to really complete the building, a chancel, porch, and vestry will be needed, at an estimated outlay of £3,000.

GUILDFORD.—A series of women's almshouses is being erected next the county hospital at Guildford, from the designs of Messrs. Ernest George and Peto. They will form a quaint group of twelve houses around three sides of a quadrangle, in the centre of which will be a sun-dial. Each house will consist of a living-room with bay window, and recessed chimney-corner with settle, and small window, and also a bedroom and scullery, and an external porch, all being on the ground-floor level. The buildings are of red brick, with tile roofs, wooden cornices, and white window-frames. The charity was founded in the Curtain-road in the City of London, but Lord Onslow has given the present site in Guildford, and the old one has been sold for warehouses, thus increasing the funds of the charity. The contractors are Messrs. Goddard and Sons, of Farnham.

HANDSWORTH WOODHOUSE.—A new chapel at this place was opened last week. The external length of the building is 61ft., the width 44ft. The chapel is capable of holding 560 persons on the ground-floor and the gallery, which extends all round the building. The design is Italian. The amount of the contract for the building was £2,600, exclusive of lighting and warming. Mr. Robert Hardecastle, of Woodhouse, is the contractor, and Mr. G. B. Ford, of Burslem, the architect.

HOCKERILL.—The church of All Saints, Hockerill, near Bishop Stortford, was reopened on Wednesday week, after having undergone enlargement and improvement from the designs of Mr. Joseph Clarke, F.S.A., the diocesan architect, at a cost of £6,000. We illustrated Mr. Clarke's designs for enlargement in the BUILDING NEWS of March 1st, 1878. To the church, which was built in 1851, a north aisle has been added, opening by an arcade into the nave; the nave and existing south aisle have been prolonged westwards, and the south porch rebuilt and enlarged. The chancel has been enlarged and remodelled, and an organ-chamber, and choir and clergy vestries added. The bells are now hung in a substantial cote at the north-east end of the nave. The same facing of rag stone has been used for the new as for the old work, but the harder Aneaster stone is used instead of Caen stone; internally, with the exception of the bases, shafts, and caps of the columns, Coombe Down stone is used. The roofs are of pitch-pine, neither stained nor varnished, and the seats throughout of oak, solid in construction. The chancel floor has been slightly raised and laid with Godwin's encaustic tiles. The shafts of the east window and chancel arch are of picked Devon marbles. The contractor was Mr. Gregory, of Clapham Junction, S.W., his foreman being Mr. W. J. Crook. Mr. J. White acted as clerk of works. The windows, several of which were originally filled with stained glass, by Messrs. O'Connor, of London, have been rearranged and altered by their successor, Mr. Taylor, of Berners-street, W. The church has been warmed with hot-water by Messrs. Price and Son, of Adam-street, Adelphi.

NOTTINGHAM.—New baths in Gedling-street have just been opened by the corporation. The building measures 123ft. by 60ft., and contains a bath proper 102ft. by 44ft., with semicircular ends, and when filled to the proper height the bath contains 130,000 galls. of water. The roof is in one span of 60ft., and is carried by seven wrought-iron ribs, semicircular in shape. The soffits of the ribs are 29ft. above the coping of bath, and the total length of rib, including part below floor level, is about 95ft. Each rib for a height of 9ft. above floor level is of cast iron, the remainder is of wrought-iron with open lattice-work. The weight of each rib is about 5½ tons. The building is ventilated by a louver nearly 2ft. wide, running the whole length of the roof, the top being entirely glazed. Dressing-rooms, thirty-eight in number, and a jumping stage have been provided, and the woodwork of which these are made, as well as underside of the woodwork of roof, is stained and varnished. The cost of the work has been about £2,500. The new building and roof have been designed and con-

structed by Mr. M. Ogle Tarbotton, engineer-in-chief to the Nottingham Corporation, and the work has been carried out under the immediate superintendence of Mr. A. Brown, assistant engineer. Mr. R. Middleton was the contractor for the general builder's work, and Messrs. Goddard and Massey for the ironwork. Mr. Carr acted as clerk of works.

METROPOLITAN BOARD OF WORKS.—On Friday at this board, the works committee were authorised to act with regard to Mr. Torrens's Artisans' Dwellings Act, 1868, Extension Bill, when its clauses are discussed in committee, as they see fit without opposing the Bill as a whole. Regulations prepared under the 12th Section of the Metropolis Management and Building Acts Amendment Act, 1875, with respect to new theatres and music-halls for protection from fire, were approved by the board. It was decided after much discussion to appoint four additional inspectors to carry out the Slaughterhouses Act, Explosives Act, the Dairies, Cow-sheds, and Milk-shop's Order 1879, at a salary of £150 a year, and the sanitary committee to receive the applications and select twelve candidates, from whom the board will elect four. £390 was voted towards a proposed improvement in Cursitor-street and Took's-court, Holborn. The solicitor reported that the agreement for the acquisition and freeing from toll of Chelsea-bridge, under the Toll Bridges Abolition Act, 1877, had been sealed as between the board and Her Majesty's Office of Works.

PENOE, S.E.—A new vestry hall for the hamlet of Penoe, erected opposite the Anerley railway station, was opened on Wednesday week. The building is faced with white gault bricks with covered stone dressings, the roof being covered with Bangor slates. A clock-turret of wood covered with zinc occupies the centre of the front, and contains a clock by Messrs. Smith, of Clerkenwell. The vestry hall itself is 57ft. long by 27ft., and has two entrances. The roof is in one span, and is ceiled in panels of pitch-pine, stained and varnished, the lower beams and moulded lines being picked out in colours. Stencilling has been applied to the architraves of windows, the walls being plastered. The hall is lighted by large twelve-light mullioned windows in front and rear, and four four-light windows at the east end, glazed with white quarry-rolled plate-glass. The dais is portable. On the ground floor are rate collector's and overseer's offices and lavatories, and on the first-floor a committee room, 21ft. by 16ft. 6in. The hall, corridors, and staircase are heated upon Gundry's system of hot air. A separate house, containing four rooms for a caretaker, adjoins the offices. The architects were Messrs. George Elkington and Sons, of Cannon-street, E.C., and the builders Messrs. J. and C. Bowyer, of Upper Norwood, who took the contract at £4,341. The gas fittings were specially designed in decorated brass, and have been executed by Messrs. Strode and Co.

RHYL.—New buildings for Mr. R. Oldfield have been erected at Rhyll, designed with the idea of breaking through the monotony of the present street architecture of Rhyll, which consists chiefly of the ordinary stuccoed fronts that are so well known at many of our favourite watering-places. The works, which are now almost completed, have been carried out from the designs and under the superintendence of Mr. O. Edwards, of Rhyll, and Mr. Wm. Owen, of Manchester. The buildings are faced throughout with 2in. red bricks. The works have been carried out by Mr. J. Rhydwen Jones, contractor, Rhyll, and the total cost is under £4,000.

Two of the vacant niches on the south side of Exeter College Chapel, Oxford, which was erected twenty years ago, from the designs of Sir Gilbert Scott, have just been filled with figures of St. James the Great with staff, and St. Philip with his sceptre. The figures are each 6ft. 9in. in height, and were executed by Messrs. Farmer & Brindley, of Westminster Bridge-road, S.E. One was the gift of an old member of the College, the Rev. Mackenzie E. C. Walcott, B.D., F.S.A., precentor and prebendary of Clithere Cathedral; the other by a subscription amongst the members. The work has been carried out by Messrs. Simms and Co., of Oxford.

At Maas, County Kildare, a large block of buildings for married men's quarters are being constructed at the barracks. The contractors are Messrs. Jones and John, of Pembroke Dock.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—W. B. and Co.—G. W. Ry. Co.—W. N. R. S. A. T. A.—B. of S.—L. and N.—R. M. and Co.—B. and T.—D. and H. J. N.—W. H. L.

R. W. (We do not know the name or address of the consignee or manufacturer in this country of the Norwegian wooden houses. We have had many inquiries from time to time respecting this matter, and if they are still supplied the makers would do well to announce the fact in our advertisement columns.)—W. G. F. (Perfectly fair, but very unreasonable. No blame, however, can attach to the other architect.)—J. J. FISH. (Sketches are to hand, and shall appear as soon as space will permit.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—Ogmore, Molina, Try, Curiose, Honey Dew, Revus, Be to its Merits, Impavidum, Ferrient Runne, Elève, Truth shall Prevail, East Anglian, Melmotte.

LIST OF SUBJECTS.—1. A small detached stable containing 2 stalls and a loose box, with harness-room and hay-loft, coach-house and coachman's rooms. Plan, section, and elevation with sketch. Scale, one-sixth of an inch to foot. 2. A summer-house in wood for a suburban garden. Scale of drawings, half an inch to the foot.

Correspondence.

RAMSGATE PROPOSED NEW ROAD COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—The letter in your last impression on this subject was most suggestive. Let us first glance at what Johnson says as to a referee or arbitrator. The last he terms an "Extraordinary judge between party and party, chosen by their mutual consent."

"Be a good soldier or upright trustee,

An 'arbitrator' from corruption free."

DRYDEN.

Of the first he says—

"Referees and arbitrators seldom forget themselves."

SIR R. L'E STRANGE.

Now, what are we to say to this Vice-president of the Institution of Civil Engineers, the arbitrator and referee of the Ramsgate Local Board who does not "compete in 'designing'" (sic). My son applied for plans and conditions? If the extension of the L. C. and D. Railway were a *sine quâ non*, why was it not so stated to competitors by the Ramsgate authorities? In other

words, was it commonly and decently honest of them to refer some seventy plans—the authors of whom, though inclined to "compete in designing" might many of them be found to be the professional equals of the Ramsgate arbitrator, who, not competing, obtains the plans prepared for competitors surreptitiously through his little boy—to a professional man interested individually in a project never referred to or implied in any way in the instructions furnished to competitors?

From an experience far anterior to that of the arbitrator, the writer of this letter joins issue entirely with him as to the benefit to be derived from an extension of the L. C. and D. into the town. A line connected with the quays of the inner harbour might be a desideratum for foreign goods, but let the townsmen of Ramsgate study Dover "ante" and posterior to the extension of the L. C. and D., and let them take warning in time. We are told the ratepayers are not bound to either of the three plans selected except as regards premiums. Let them adhere to this. It was also stated the town authorities would exhibit, if they thought fit, the designs sent in. Let them by all means do so, giving those competitors who wish it the opportunity of showing their colours and disclosing their names. The Ramsgate public would soon arrive at a just conclusion whether the premiated drawings are the best or not. There must be great similarity in the designs confined within a groove defined by a Parliamentary plan and a confined area by dotted lines of deviation and the limit of five feet vertical divergence as regards levels. Is it wise to perpetuate the Albion Hill nuisance on a great scale by compelling connection with Harbour-street and the centre of the town? Is Ramsgate expected to extend east and west? What is wanted? Is it a coast drive and promenade, or merely a town street? If the former, should not the example of Scarborough be followed and make the last subservient to the first consideration?—I am, &c.,

ANOTHER COMPETITOR WHO PROTESTS.

CREOSOTED TIMBER.

SIR,—I have been somewhat amused by the correspondence in your paper on the above subject. A portion of the evidence given by me before a coroner's jury with reference to the failure of some timber staging which had been creosoted found its way into your paper and was headed "The danger of creosoting timber." Had the whole of my evidence been before you, doubtless the heading would have been "The danger of improperly creosoting timber." Practically there is no difference of opinion between myself and your correspondents, Messrs. Armstrong and Co. The three upright supports of the timber stage which fell were all of them more or less rotten in the interior, while externally they were perfectly sound. The timber itself was some of the finest Memel that I have ever seen, was specially selected by an eminent engineer at the time the work was executed, and was very strongly put together. My evidence, which the jury and coroner adopted, proved the following facts:—

That the creosote had only extended to about 23in. into the wood from the exterior, and that the internal parts of the posts had, in fact, for many years been practically suction tubes, the water being drawn up by capillary attraction into the interior of the posts, and rotting the heart of the timber, without any chance of the decay being detected, or the gases generated by the decay finding a vent through the strongly-creosoted external surfaces to the air.

Mr. James Newlands, late Borough Engineer to Liverpool, in his "Carpenter's Assistant," p. 106, states, "There is great difficulty in injecting creosote into the heart of wood, and into hard woods it cannot be perfectly injected." Certainly, in the present case, the creosote had never reached the heart of the timber, and hence, in my opinion, the decay to all the posts. No doubt the process has of late years been brought to a much greater degree of perfection than it was about 25 years ago, when this wood was done, for instance. I am informed it was customary to force about 5lbs. of creosote into each cubic foot of wood, but that now as much as 10lb. per cubic foot is frequently forced in.

The late Mr. Brunel used on the Great Western Railway works invariably to insist that the timber should be weighed in order to ascertain that every part of the wood had imbibed its proper quantity of creosote.

No one will dispute for a minute that porous timbers are much improved by the process, such as the fir at Capo Town, and the railway sleepers, &c., alluded to by your correspondents. I think however, reflection will convince any practical engineer, that unless the creosote thoroughly enters into the heart of the timber it is certainly unwise to use it for wooden supports standing in water.

It is well known to every sailor, that if wooden spars and posts on board ship are coated all round with black varnish the wood speedily decays, and were an upright post to be partly fixed in water, the portion above the water-line being hermetically closed all round by lead the wood would certainly quickly rot; and unless the creosoting is properly performed, the system of false circulation kept up in the heart of the timber when it stands in water, would in my opinion do more harm than good. The moral is, either make sure that the creosoting to timber piles is properly performed, or use the wood in its natural state.—I am, &c.,

ROBERT WALKER.

STREET CARRIAGEWAY PAVEMENTS.

SIR,—In your issue of the 2nd inst. you give an abstract of my paper on "Street Pavements," recently communicated to the Institution of Civil Engineers. The heading of the principal table, however, is altogether omitted, and without it the figures are scarcely intelligible, as it explains that the prices are reduced so as to apply to a standard traffic of 100,000 tons per annum for every yard of width in carriageway, while the second table applies to a standard traffic of 40,000 tons per annum for every yard of width in carriageway.

Owing to the closer printing of the portion of the paper relating to the dimensions of sets a misapprehension would readily arise, and it appears necessary to explain that the width of the sets is not 4in. to 14in., but that four sets measure 14in. in width. The heading of the tabular forms giving the dimensions of sets contains the expression, "Hard stone in which joints were unnecessary for foothold;" it should be, "Hard stone, in which joints were necessary for foothold."—I am, &c.,

GEORGE T. DEACON.

Borough Engineer's Department,
Liverpool, 5th May, 1879.

CREWKERNE GRAMMAR SCHOOL COMPETITIONS.

SIR,—It is now more than three months since the drawings were sent in for the above competition, and, so far as I know, none of the competitors have heard a word about it, nor has any acknowledgment of the receipt of the drawings appeared in either of the professional papers. Surely it is time something was made known. Can any reader throw any light on the subject? I am, &c.,

A COMPETITOR.

PROPOSED MUNICIPAL BUILDINGS, GREENOCK.

SIR,—I have sent the inclosed letter to the Provost and Town Council of Greenock, and shall be glad if you will insert it.—I am, &c.,

A COMPETITOR.

"To the Provost and Town Council of the Borough.

"Gentlemen,—Having sent in drawings for the above, permit me most respectfully to call attention to a report which has just reached me to the effect that your own harbour engineer is amongst the competitors. Whilst unwilling to believe that a gentleman holding a good salaried appointment as engineer from a board of which you are all members would attempt to compete for an architectural work of which you are to be the judges, or yourselves permit a proceeding so manifestly unfair to all the other competitors, I feel it my duty to bring to your notice what is being said on the subject, trusting it is without foundation. Should, however, such drawings have been sent in, you will at once see that any report your master of works might make as to the relative merits of the plans submitted would certainly be looked upon with suspicion from the fact of his having been so long in the office of the engineer alluded to, and consequently interested in its success. About sixty gentlemen have, I believe, shown their confidence in you by submitting at your own request, and considerable expense and trouble, drawings for your selection, and I feel sure that, as public men, you will show that it has been rightly placed by excluding all paid officials from the competition, and awarding the prize to the best plan.—Faithfully yours,

"A COMPETITOR."

Entercommunication.

QUESTIONS.

[5757].—**Lime and Portland Cement.**—It is a popular plan in Staffordshire to mix Portland cement and lime-mortar for pointing. Is it a desirable compound?—M.

[5758].—**Descending Flue.**—I wish to construct a stove or fireplace in entrance hall of villa, with descending flue passing under room floor to flue in wall, 18ft. distant from wall of hall, which is only 9in. thick. Will some reader who has done similar work give particulars, with sketch if possible as to most suitable form of stove, construction of fireplace, and flue under floor, so as to secure efficiency and safety?—W. W. W.

[5759].—**Timber Verandah.**—Whether is oak, teak, or pitch-pine the best timber for use in outside construction of verandah or porch, and what is most suitable treatment in way of varnishing, &c., for durability and beauty?—W. W. W.

[5760].—**Carrying Weight of Floor.**—What weight per superficial foot will a floor carry with timber of the following dimensions:—Beams (pitch pine), 16in. × 9in., 18ft. hollow, and 9ft. 6in. asunder; joists, 9in. × 3in., and boards, 1in. thick.—WORKMAN.

[5761].—**Built Girder.**—Would Mr. H. Ambrose or other of our kind friends inform me through your columns what would be a safe distributed load (consisting of brick-work with window openings) for a girder of the following description to carry—viz., Two rolled iron joists, 16in. × 6in. × 3in. web throughout, with top and bottom plates each in one length, 14in. × 3in., and 14in. × 3in. respectively, riveted to joists, to have a clear bearing of 31ft. Also, whether the stronger plate should be on the top or the bottom?—H. S. WARRINGTON.

[5762].—**Local Board By-Laws.**—Will you or some of your numerous readers inform me and my fellow parishioners, through your valuable paper, how to go to work to get certain restrictions contained in our Board of Health by-laws amended or rescinded? What pressure can be brought to bear upon the members of the board? What constitutes advertising them previous to their being sent to the Local Government Board for sanction?—COUNTRY BUILDER.

REPLIES.

[5752].—**Coloured Building Stone.**—The names of stones I gave, if overdone, were intended to reply to a certain question which "J. W." has overlooked. As to what are the best coloured stones for a certain locality or position is altogether another question, and is one which the architect himself must decide. What may please "J. W." in colour would probably be distasteful to another, and the obvious want of the profession is the names of stones classified as regards colour and durability. The Red Mansfield referred to is, when well selected and laid, a durable stone, and the darker varieties wear the best. St. Pancras Hotel in the Euston-road shows the employment of this stone on a large scale, and where its peculiarities can be fully tested.—G. H. G.

[5745].—**Wood Roofs.**—Thanks to Henry Ambrose for his trouble, but I fail to see the working out of his formulae. For the latter he gives the figures "295" and "294" but how does he arrive at them? If it would not be troubling him too much, would he kindly give detailed workings out for the various parts, assuming certain strains to be on those parts. Also thanks to "G. H. G.," but why such a vast difference between the sectional area given by the way he mentions, and the sectional area given by "Tredgold"? An answer would oblige, stating how the difference is made up.—NIL DESPERANDUM.

[5751].—**Board School Plans.**—It is not necessary that the quantities be sent with the specification, but a comprehensive set of plans are required, including a block plan of the site, showing drainage, &c., together with elevations and sections. These are generally sent to the education department through the clerk to the school board, and must be again sent up for final approval after the cost of carrying out such plans has been ascertained, but before any contract has been entered into.—R. C.

[5752].—**Staining and Polishing Church Seats.**—"V." can give any desired colour to his deal church seats by using Benson's stain. I have stained deal floors very successfully with it. The powder is in shilling packets, weighing something over an ounce, and making when dissolved in water, one quart of stain. It must be applied with a common brush, as it has one fault, it spoils the brush. For a light shade such as "V." wants, a packet would do about 150 square feet, I think. The dull polish must be given by rubbing with boiled linseed oil. For floors beeswax and turpentine is best, no varnish required. I bought mine at the Army and Navy Stores. There is no smell or mess in using it.—R.

[5753].—**Abutments.—Struts and Braces.**—The formula referred to by "Alt Belcher" can be worked as follows:—Say, L = 10 and p = 10, then B = 0.6 D and D = $\sqrt{L \cdot p \cdot \frac{1}{2} \times 0.8}$ (fir). Let us find D (using fir), then D = $\sqrt{10 \times 10 \times \frac{1}{2} \times 0.8}$. Find $\sqrt{10}$. Log. of 10 = 1.000,000, and divided by 2 we shall find the nearest Log. gives 3.163. ∴ D = $\sqrt{10 \times 3.163 \times 0.8} = \sqrt{3.163 \times 0.8}$ Log 3.163 = 1.500099, and 1.500099 = Log. 750099, and which gives 5.071. ∴ D = 5.071 × 8 = 4.056, say, 4in. = D = depth and B = breadth to be 0.6 D = 2.4in., and thus a strut 10ft. long in a roof truss would come out by formula quoted practically 4in. × 2½in. Can same be strong enough?—HENRY AMBROSE.

[5753].—**Abutments.**—According to formula quoted last week, and worked according to the explanation of same given in Spon's book of "Architects' Formulae," &c., or according to what may reasonably be construed to be meant by same. Take for an example an arch of brick to stand by itself and 22ft. span, and to be semi-circular, then the radius will be 16ft. Let us find D, D = $n \sqrt{R}$ = 4 × 4 = 16 = D in feet. Now, "W" = weight of one foot in length of half arch in cwt., which we shall construe to mean the average weight of a foot girt under

soffit of that part of the arch above the arch joint at or nearest to 45° of inclination with the horizon. Now, this must necessarily include any weight which may bear on that part of the arch in addition to the weight of the arch itself, and what may be permanently placed on it for the purpose of weighting it heavily in equilibrium, although a semi-circular arch, if of an equal thickness, can never be said to be even approaching a state of equilibrium, its curve being so different to the parabola, whose double ordinate would be = span and its absciss = radius; but with any arch the greater the properly distributed permanent load placed on it the less will a moving load on any point affect the then weakest part of the arch, and provided always that our load cannot crush the material of arch itself. To proceed, let us assume two tons per foot = 40cwt. as = W. "H" we shall assume to mean the height of the springing, in feet, above the solid foundation on which the abutment pier or abutment is built. "R" = radius at the crown in feet most probably contemplates the possibility of a parabolic arch, and in which R would be much less. We should have to assume a radius equal to about half the principal parameter, and when, of course, by our formula we should have less pressure built-up on the abutment and much more now being downwards as weight instead of horizontal pressure. To resume, let H be equal to 10ft., and "T" = thickness of the abutment in feet. Then

$$T = \sqrt{1.5R^2 + \frac{2}{3}R^3} + \left(\frac{W}{H}\right)^2 - \frac{W}{H}$$

$$= \left(2 \times 256 + \frac{1}{3} \times 10^3 + \left(\frac{40}{10}\right)^2\right)^{\frac{1}{2}} - \frac{40}{10}$$

To find R^{1.5} without being in an exponential form, we may here remark that exponents of evolution when expressed in a vulgar fractional form mean that the vulgar fraction of the logarithm of the number under the exponent may have to be found, and the resulting decimal fraction will be the logarithm of the number required. If the vulgar fractional exponent is an improper fraction—that is, if it is greater than unity, and if the decimal logarithm to be operated on is nearly equal to unity, it will very likely follow that the consequent multiplication will produce a logarithmic quotient also greater than unity, when the proper decimal pointing will show that which we shall have to include in the index of the number required. In multiplying it will also be necessary to cut off any decimal places we may obtain exceeding the decimal places to which our tables work, and in cutting off more than figure 5 we should make the next figure, and which we retain, greater by 1, or if it is a 9 then make it a 0 and carry one to the next place. To proceed—

$$\begin{aligned} R^{1.5} &= 16^{1.5} \\ \text{Log. } 16 &= 1.204120 \\ \text{Log. } 16^{1.5} &= 1.102660 \end{aligned}$$

2.306180 = Log. 202
∴ R^{1.5} = 202 and 202 × 2 = 404
80.8, and 256 × 1 = 256 × 2 = 51.2, and $\left(\frac{40}{10}\right)^2 = 4^2 = 16$, and $\frac{40}{10} = 4$. Hence we have T = (51.2 + 80.8 + 16)^{1/2} - 4 = (148)^{1/2} - 4. Log. of 148 = 2.170262 and $\frac{2}{10} = 0.2$
= 1.085131 = Log., say, 12.17, hence T = 12.17 - 4 = 8.17, and $\frac{17}{100}$ of a foot will be $\frac{12 \times 17}{100}$ of an inch = $\frac{204}{100}$ of an inch = 2.04 inch. Therefore the thickness of the abutment comes out according to the formula in Spon's book at 8ft. 2in. thick, and which happens to be about 4-5ths its height from foundation to springing.—HENRY AMBROSE.

[5755].—**House Details.**—The strips of lead referred to are put in with the view of preventing the damp from finding its way to the inside 4½in. work over the top of arch or lintel. They are placed over the lintel of opening and should turn up about 3 or 4in. on each side of the cavity into the joints of the brick and stone work, and as the cavity is 2½in., 10 or 12in. in width would be sufficient for the purpose.—Q.

[5755].—**House Details.**—The strips of lead should be about 4in. wide let into the outer wall above the openings and dressed over the frames. It should be turned up slightly against the inner brickwork, though not to touch it, so that if the wall let through the wet it should not touch the inner face but be carried away into the hollow. The mode I have adopted is not to let the lead touch the inside brick wall, though it is sometimes laid upon the frame and simply dressed up on each side, a plan that is ineffective in many instances. Often "coppers" are made of galvanised iron, and not copper, but which the specified article is to be will depend on the wording of specification. If a "25-gallon copper" only is mentioned the builder may plead that an iron one was all he intended. I have known several instances where a similar case of dispute has occurred, and in default of precision or qualifying meaning, the builder has the best of the contention.—G. H. G.

STAINED GLASS.

TICHMARSH.—A stained glass window, by Messrs. John Hardman and Co., has lately been erected in the south side of the chancel of Tichmarsh Church. It consists of three lights and tracery of the style of the 15th century, in accordance with two windows in the same wall, and the large east window in the chancel, all of which are the works of Messrs. John Hardman and Co. The subjects represented in the window now erected are:—In the dexter light, "Feed My Lambs"; centre light, "The Widows showing St. Peter the Coats made by Doreas"; sinister light, "St. Peter walking on the sea." The heads of the lights are filled with canopies, and the bases with angels holding scrolls containing texts, and at the extreme foot of the lights is the inscription recording the dedication of the window.

Cardigan Town Council last week adopted the plans of Mr. A. Szlumper, C.E., for the proposed new waterworks, and entered into the purchase of a site for the proposed reservoir.

WATER SUPPLY AND SANITARY MATTERS.

WATER SUPPLY AND ENTERIC FEVER.—The report of Dr. Thorne Thorne to the Local Government Board upon the results of his official inquiry into the late outbreak of enteric fever at Caterham, Redhill, and the neighbourhood has been issued. With regard to Caterham, the inspector says that the first person attacked sickened on January 19th, and up to February 2nd 47 persons were attacked. Of 558 houses in Caterham, 419 were provided with water from the mains of the Caterham Waterworks Company, and of the 47 persons attacked 45 were found to have resided in houses supplied with the Company's water, and the remaining two to have visited such houses and drunk the water. At Redhill similar circumstances were known to exist. Up to the end of February the total number of attacks reported was 303, 224 occurring in Redhill, 9 terminating fatally; and 81 at Caterham, 5 terminating fatally. At Earlwood Asylum, where the first case occurred on January 28th, 38 persons were attacked, 33 being patients and 5 servants, and here 5 fatal cases occurred. The progress of the disease in this institution seems to have been stayed by the medical superintendent, Dr. Graham, having cut off the Caterham supply of water on February 8th. Out of 622 houses in Godstone, Betchingly, and Nutfield, 96 were provided with the company's water, and at 9 fever prevailed, 6 being at Nutfield. The total number of cases to the end of February was 352, and the total of deaths 21. Dr. Thorne having so far tracked the fever to the water, next made inquiry as to whether any accidental contamination of water in the reservoirs or in the mains could have resulted from any irregularities in the supply during the recent boring operations, but circumstances led to the inquiry being extended in another direction. During the latter part of 1878 and the beginning of 1879 the Caterham Waterworks Company constructed an adit from one of their old wells up to the new bore, which was then being sunk. The adit is situated in the chalk at a depth of 45ft., it measures 6ft. by 4ft., and is 90ft. in length. A number of men were employed in this work, some of them being in the well below, others on the surface. Inquiry was made as to whether any of these ailed while at their work, and it was ascertained that one of them who left work some time in January was believed to have been ill, although no inquiries had been made concerning him since he quitted the works. This man the inspector sought out; Mr. Jacob, the medical officer of health, accompanying him. From investigation they ascertained that the man was employed as "loading man" at the new adit, and whilst at work was seized with enteric fever of a mild character which compelled him to evacuate in the adit, and the bucket used was then lifted to the surface, emptied, and used for the conveyance of materials into the adit. Dr. Thorne points out that where enteric fever has been conveyed through water, some fortnight has to elapse between the distribution of the water and the occurrence of the disease among the community served by it. But a fortnight after January 5th was the very day on which the first case of fever occurred, and during the fortnight following upon the period January 5th to 20th, i.e., from January 19th to February 3rd, the disease became widely spread throughout Caterham and Redhill, the distribution of the fever being limited to houses supplied by the Caterham Company. There can, he thinks, be no doubt but that they had in the man alluded to the cause of the epidemic which followed. To the Caterham Water Company Dr. Thorne suggested the following remedial measures:—First, to pump their wells dry, if possible; secondly, to scrape the walls of the wells and adits, afterwards scouring them thoroughly with a strong disinfecting fluid; thirdly, thoroughly to cleanse the reservoirs and wash them with disinfectants; and fourthly, to saturate with a similar fluid all the soil in the vicinity of their works where the chalk had been deposited. In view of the manner in which these measures had been carried out, Dr. Thorne, on March 5th, communicated to the several sanitary authorities his opinion that, although in the absence of any test capable of showing the safety of the water, it was difficult to speak on the point with authority, yet he thought the time had arrived when it might again be distributed by the company without danger to the public health. He was glad now to add that nothing had since occurred which led him to believe that the expression of this opinion was premature.

LEGAL INTELLIGENCE.

ROOFING REPAIRS.—At Lambeth County Court last week, before Mr. Pitt Taylor, the case of Hollday v. Bivard was heard. Plaintiff is a builder of Loughborough and Brixton, and defendant resides in Rosendale-terrace, West Dulwich. Plaintiff had repaired the roof of defendant's house, and charged £10 6s. 8d. for the same. Defendant con-

sidered this charge unreasonable, and tendered £7, which was paid into court. Plaintiff declared that the charge was fair, and that it had been sanctioned by Mr. Taylor, surveyor, who had examined the work in company with plaintiff and defendant. The judge, after hearing evidence, considered there had been an overcharge, the sum paid into court being in his opinion sufficient, and gave judgment for defendant.

SERIOUS CHARGE AGAINST A LEICESTER ARCHITECT.—At Leicester Town Hall last week, Thomas Barnard, architect, Leicester, was brought up before the Mayor, charged under the Bankruptcy Act, 1869, with failing to deliver up to Edward Roberts, the trustee of his estate, all real and personal property, books, documents, and papers, as required by law. The particular act upon which that charge was based was the receipt by him of a sum of money, amounting to about £50, some time in January or December, from Mr. Hill, of Loughborough, after the filing of the petition for liquidation. It appeared that Mr. Barnard was appointed arbitrator between two men named Hill and Loveday, and the whole of the labour in connection with the arbitration had been concluded before the filing of the petition. The debtor's charges in connection with that arbitration amounted to £94, and a cheque was given by Hill for £50, which was made payable to Barnard, and endorsed by the latter in order that he might avail himself of that sum for his own purposes, instead of handing it over to the trustee. The Bench decided to adjourn the further hearing of the case. Bail was refused.

CHIPS.

New dispensary premises have just been erected in Silver-street, Lincoln, and were occupied for the first time on Wednesday week. They are Queen Anne in style, the ornamentation being of terracotta.

Plans for the further improvement and re-laying out of the Cattle Market in Gloucester Green, Oxford, rendered necessary by the removal of the city gaol, have been prepared by Mr. Codd, architect, of that city.

A new cemetery is being laid out at Caister, near Great Yarmouth, and the members of the Burial Board, to reduce the expense, have taken upon themselves the duties of surveyor, architect, and clerk of works in laying it out. The ironwork and gates are being supplied by Messrs. Barnard, Bishop & Barnards, of Norwich.

A new road is being constructed at Pembroke Dock for the Government, from the ordnance wharf to the garrison magazine, near which a drill shed, 100ft. by 40ft., is also being erected. Both the works are being carried out, under contract, by Messrs. Jones & John, of that town.

The Chelmsford local Board of Health, on Wednesday week, adopted the plans and estimates prepared by their surveyor, Mr. C. Pertwee, for the joint sewerage of Chelmsford, Springfield, Great Baddow, and Widford, and directed their clerk to apply to the Local Government Board for a total loan of £20,000 for carrying out the scheme.

The Parish Church of Woodton, near Bungay, was reopened last week after restoration. The work has been, a Norfolk journal says, "executed by, and under the superintendence of, Mr. R. Morris, builder, of Ditchingham, who has presented a cover for the font."

An inquest has been held at Chelmsford on the body of Robert Sorrell, aged 65, builder, of Friars-place, Moulsham, who committed suicide on Saturday week by shooting himself through the head. Evidence having been given as to Mr. Sorrell's mental condition, a verdict of suicide while in an unsound state of mind was returned.

The president and fellows of St. John's College, Oxford, have accepted an estimate for the restoration of the front of the College, and the addition of a new hall and kitchen, upon the designs submitted by Mr. G. Gilbert Scott, R.A. The cost will be £40,000, and the works will be commenced in the long vacation.

The work of taking down the spire of the parish church at St. Ives, Hunts, which has been pronounced in a dangerous condition, was commenced last week by the contractors, Messrs. John Saint and Sons, builders.

On Saturday the memorial stones were laid at Elland of a Methodist New Connexion church, which is being erected from the designs of Mr. William Hill, F.R.I.B.A., Leeds. The new church will be in the Gothic style. The cost will be about £4,000, in addition to which about £1,800 has been expended in enlarging the school. The contractors for the new works are Messrs. Armitage and Hodgson, Leeds.

A new post-office is about to be erected at Scarborough. Tenders were advertised for a few weeks since, and the Board of Works have accepted that of Mr. Wetherley, contractor, York, for £5,000.

Our Office Table.

SIR FREDERICK LEIGHTON presided for the first time on Saturday evening at the banquet at the Royal Academy, when the Forty entertained five Princes, as many Ambassadors and Ministers, and a large number of the leading men of the day among their guests. The Earl of Beaconsfield, in responding for her Majesty's Ministers, regretted that the Government had not the means in greater degree of showing its sympathy with the fine arts. He suggested the Wars of the Roses as furnishing materials for the exemplification of the highest art of the English school. English painters and sculptors have in our opinion far better subjects to represent than episodes from a conflict between two aristocratic factions in which the nation had little interest at the time, and has none now. Little was done, either by York or Lancaster, of which Englishmen may feel proud, and the crimes and misfortunes of the principal actors, even when portrayed by Shakespeare himself, somehow fail to awaken our horror or interest in anything like the same degree as the more remote and apocryphal incidents of his greater tragedies.

"The Parish and Church of St. Sepulchre" was the title of a lecture delivered before the London and Middlesex Archaeological Society, by Mr. J. E. Price, on Monday week. The history of the church was traced from its first mention in the Twelfth Century, when it was associated with the Knights of St. John of Jerusalem, to the present time, the numerous and valuable bequests of land towards its repair and support being enumerated. At the time of the Great Fire in 1666, the church was considerably damaged, but by no means destroyed. The casing which covered the original walls has recently been removed, revealing that the masonry was calcined by the heat, the tower arches especially suffering. It was known that the interior of the church was gutted, and that the bells were melted. It had been often asserted that Sir Christopher Wren had little to do with the reconstruction of the church, but Mr. Price refuted this error by reference to Elmes's biography of Wren, to the actual ledgers of Wren now preserved at the Bodleian Library, Oxford, showing the payments made to him by the rector of St. Sepulchre's, and to the vestry minutes, which proved that Sir Christopher restored and partially rebuilt the church on the former plan, that the work was commenced in 1677, and that the total outlay was £4,993 14s. In conclusion, the restoration works recently carried on in the church under the superintendence of Mr. Billing, were described.

At a meeting last week of the Midland Association of Gas Managers at Birmingham, Mr. C. E. Jones, resident engineer and manager of the Chesterfield Waterworks and Gaslight Company, read a paper on "Public Lighting, with special reference to streets." He said the public lighting of the metropolis, except in certain cases, was perfectly disgraceful, and that in Birmingham a state of things existed which was little better. He detailed the results of some experiments he had conducted, showing that by the use of inferior glass in the glazing of lamps there was in some instances a loss of 14·38 per cent. of the illuminating power of the gas, and that in the case of a piece of glass which had become "etched" by the weather and allowed to become dirty, the loss was as much as 83·81. This showed the importance of using good clear glass, of a description capable of resisting the action of the atmosphere, and it also pointed to the importance of cleaning lamps more frequently than was generally done. He thought the electric light in its present stage of development could scarcely be called a competitor with coal gas, where that article was sold reasonably cheap. If coal gas were seven or eight times its present price some degree of anxiety might be felt, but even then the advantages attending the use of gas would preclude the possibility of its being superseded. The cost of the electric light was about seven and a half times that of gas; but it was useful in exceptional circumstances, such as where coal gas was not available.

LAST Friday night a crowded meeting of delegates from the various societies connected with the building trade was held at the Rose, Old Bailey, to consider the advisability of federating the workmen belonging to them throughout the

United Kingdom. The chair was taken by Mr. Thompson, of the Operative Bricklayers' Society. Many thousands of workmen were represented by the delegates present. A resolution was ultimately passed declaring that a federation of the building trades of the United Kingdom was desirable and necessary, and pledging the delegates present to use every effort to give it a practical form. A committee, consisting of two delegates from each trade represented, was elected for the purpose of drawing up a series of questions and proposals to be submitted to the executive councils of all the building trade societies in the United Kingdom, for their consideration, replies, and opinions.

"AN ARCHITECT" dating from 10, Serjeants' Inn, Fleet-street, and whose identity can easily therefore be inferred, writes to the *Cambridge Chronicle*, stating that there is at this moment for sale in London, a large selection of the ancient (14th and 15th century) woodwork of the chapel of Jesus College, Cambridge, bearing the arms and insignia of Bishop Alcock, the founder. There are, he says, four stall ends of vigorous workmanship and great beauty, some eight or ten misericords magnificently carved, and a large quantity of canopy work of old screens, wrought with a delicacy and a spirit that render them valuable examples of mediæval woodwork. It seems that at the close of the last century the stalls of the choir and other portions of the ancient furniture of Jesus College Chapel were taken out and sold, probably to make room for debased Classic work, and that some of the old materials found their way to Landbeach Church, and remained therein, eccentrically disposed about the edifice, till its restoration a year ago. The writer adds that the present rector of Landbeach, Dr. Bryan Walker, at once to augment the repairing funds of his church, and to restore to its rightful position and locality this fine woodwork, entered into negotiations with the Dean of Jesus College, but they could not agree as to price, and the consequence was the woodwork was sent for sale to London. Unexplained, it certainly appears a reflection on the just pride in their past history, and the munificence of the authorities of an ancient college, that they should be unwilling to offer for the recovery of the chapel decorations, presented by one of their most distinguished members, the market price of the woodwork for the adornment of bondoirs and summer houses.

Prof. J. P. HENDERSON, of Loyola College, Baltimore, Prof. J. E. Watson, of Oberlin College, Ohio, and some students of mineralogy, have been testing the capacity of marbles and other monumental stones to withstand the corroding influences of climate. Their first examination was of granite, of which 382 different specimens were tested. While most of these were composed of such materials as would wear tolerably well in the open air, nearly every piece showed a lack of ability to withstand long exposure to rough weather. Marble was then tried, and as Vermont and Italian marbles are most used in the United States for out-door monuments, attention was given chiefly to these. The principal quarries of Vermont are the West Rutland, Sutherland Falls, East Dorset, Pittsford, and Columbian. In point of durability the West Rutland marble was found to take the precedence, and the others followed in the order of their names. They found also that the native Vermont marbles are better adapted to stand the American climate than the Italian, which is rapidly going out of use, and will most likely disappear entirely for outside work.

A DESPATCH from Easton, Pa., states that the cleverest feat of engineering ever attempted in that region has just been successfully carried out. It seems that, owing to their immense weight, the iron shoes, in which rest two of the spans of the long bridge of the Lehigh Valley Railway, had sunk about an inch, throwing the bridge out of grade. The inside masonry of the pier being less solid than the outer casing, it was evident that the depression would continue; accordingly an iron casting, 12ft. long, 3ft. 3in. wide, and 3in. thick, and weighing 7,000lb., was placed under the spans to elevate them, the spans being raised for that purpose by hydraulic jacks. The spans weigh 180 tons each. The spans were raised, the masonry redressed, the castings placed in position, and the spans lowered, without the stoppage of a single train.

The new station extension at Lime-street, Liverpool, is now approaching completion. About three and a half years ago the work of

excavation was begun by Messrs. Taylor and Thompson; Mr. E. W. Ives, C.E., was entrusted with the contract for carrying out the erection of the roof, which was commenced under his direction on the 6th of April, 1878. The whole of the immense roof has been put up at the rate of three bays per month, each bay weighing 62 tons, the work including the removal of the staging, which in itself weighed 510 tons, from one position to another; and it may be an interesting fact to engineers to know that one of these bays was completed in the short space of 5½ days. There are altogether 18 bays in the roof—the iron work weighing somewhere about 1,800 tons—in connection with which there will be 84,000 square feet of glass, four-fifths of which are now completed. The roof is arched, with diagonal struts, and flat bar bottom tie rods. The total rise to the top of the boom is 42ft., and the rise of the tie rod is 25ft., the proportions throughout being exceedingly good. The roof is supported on cast-iron columns, each of which weighs 11 tons. The columns of the old station and new extension are braced together with iron rings, so as to give them greater stability. When completed, as already stated, it will cover the largest area of any station in England, in two clear spans of 200ft. each.

A CORRESPONDENT of the *Citizen* describes the manner in which water-closets and cisterns are ingeniously contrived, in many suburban houses in the metropolis, so as to spread in the most effective manner the germs of enteric fever. He says:—On a large area in the neighborhood of Stoke Newington, Kingsland, and Ball's-pond, several thousand houses have been built, and very many of them have the water-tank over the water-closet, the latter being on the landing, and inside the house; the soil-pipe of the water-closet runs into the drain leading to the main sewer; the waste pipe from the roof is inserted and runs into the soil-pipe, and to flush the water-closet a pipe runs into the tank. By pulling a wire a valve in the bottom of the tank is lifted, and so much of the foul air in the pipe as is not forced by the water into the closet, forces itself through or mixes with the water in the tank, used for drinking and other purposes.

The exhibition of electric lighting apparatus at the Albert Hall was a success so far as such an exhibition could be. Those who attended Mr. Preece's lecture had a unique opportunity of appreciating the effects produced by the various systems of lighting, and the exhibitors are to be thanked for the trouble they have taken with so little prospect of benefit to themselves. Nearly all the machines and lamps hitherto used in the production of the electric light were exhibited, and on the occasion of Mr. Preece's lecture, besides the five Siemens' lamps in the dome and the Jablochhoff lamps around the building, the other lamps were described and their powers displayed by experiment. The effect of the flood of light in such a building as the Albert Hall, crowded with a gaily-dressed audience, may be better imagined than described; but at any rate its advantages over gas were fairly demonstrated.

The *Athenæum* refers to a "mild controversy" which has lately prevailed among visitors to the library of the Anthropological Institute. Dr. E. V. Hayden has presented his magnificent album of photographs of members of 70 Indian tribes of the United States. The chiefs are depicted some with scalping-knives, scalp, and tomahawks, and some in coat-tail costume. Among the Ojibway chiefs is a photograph of Hole in the Sky, and this is declared by some to be no other likeness than that of Prof. Ruskin. At all events it resembles him much. It is not suspected that the photograph of an Indian chief has been abstracted by some amateur since its arrival here, and replaced by that of Mr. Ruskin. It can scarcely be believed that Prof. Hayden has been imposed upon by some American wag, and a *carte* of Mr. Ruskin been foisted on his collection. This can, however, be tested by examining the name of the photographer on the back, and if it proves to belong to the Survey then there is an end to the suspicion of its genuineness, but the resemblance to the enthusiastic art critic remains a matter of curiosity.

MR. HORMUZZ RASSAM has, it is said, discovered a very important cylinder of eight sides, about 20in. in height, and about 6 or 7in. in diameter. This cylinder, which perpetuates a historical inscription covering at least ten years of the reign of Sennacherib, and embracing the

period of that monarch's wars against King Hezekiah, was discovered in a foundation course of the south-west palace, on the mound of Koyunjik, and was probably one of the memorial stones placed there on the completion of the palace. The cylinder, as far as can be inferred from the photographic representations which have arrived in this country, is in an extremely good state of preservation.

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CHIPS.

The woodwork of the new high roof of St. Alban's Cathedral being completed and ready for fixing, the contractor has called on the Faculty Committee to decide on the covering, which was deferred in order to see whether an adequate amount would be specially subscribed for lead. This has not yet been done, but enough has been subscribed to induce them to run the risk, large as it is, of doing the work in the way that the subscribers generally desire, and they have ordered lead accordingly. The deficiency of funds is still nearly £4,000, which must be provided by the end of next year.

Extensive improvements are about to be carried out on the Late Norman Church of St. Bartholomew, Winchester, from the designs of Messrs. J. Colson and Sons, of that city. Two bays are to be added to the northern aisle of the nave, the western gallery is to be removed, while the present lath-and-plaster ceiling of the nave will be removed so as to remove the handsome oak timbers of the original roof.

The foundation stone of a new Episcopalian Chapel was laid at Port Patrick, Isle of Man, on Wednesday week. The chapel is being built from the designs of Messrs. Barry and Son, architects. It will be Gothic in style, and will measure 6ft. by 23ft. 120 sittings will be provided at an estimated cost of £750, including land. The contractors are Messrs. Harrison and Kinnig, of Peel, and the chapel is to be completed by November next.

Lewes has followed the example of most other country towns in the south of England in removing the cattle market from the High-street to an inclosure at some little distance. The new market which lies between the railway and St. John's Church was opened on Tuesday. The plans for the market, its buildings, pens, and stalls were prepared by Mr. H. Card, surveyor, of Lewes. The contracts for the excavation and levelling were taken by Mr. James Pickard, St. Ann's, and that for the settling rooms, offices, and fencing was taken by Mr. Harman.

Plans are being prepared by Mr. Hodgson for the sewerage of the town of Wigton.

The foundation stone of a new church for Killinghall, near Harrogate, was laid on Saturday week.

The construction of the sea-wall and breakwater at Newhaven is being rapidly proceeded with. Nearly 400ft. are already constructed, the season having been exceptionally favourable. Two hundred and sixty men are employed on the works. Mr. F. D. Banister is the engineer-in-chief, assisted by Mr. Alfred E. Carey, and Mr. Robinson is the superintendent of works.

The parish church of Coxhill, in the East Riding, was re-opened on Monday week after complete restoration, effected at an outlay of £3,000.

The corporation of Doncaster have decided to adopt a recent report made by Mr. Hawkesley, C.E., on their new waterworks at Ravensfield, and to carry out certain additional works which he has recommended with a view to staying the leakage at their main reservoir.

A stained-glass window has been erected in the north aisle of Maisemore Church, Gloucestershire, by Messrs. A. Gibbs and Co., of London. The subject is our Lord's charge to St. Peter.

The Palmerston Park line of tramways in Dublin was opened for traffic by the Dublin Central Tramway Company on Monday.

The foundation stone of a new vicarage house for the parish of Holy Trinity, Bridgwater, was laid on Thursday week. Messrs. Down and Son are the architects, and Mr. Escott, of North Petherton, is the contractor.

The local board of Bognor have appointed Mr. Marshall clerk of works for the new drainage scheme, at a salary of £3 per week.

A new church is about to be built at Triangle, near Halifax, from the designs of Mr. Barber, of Halifax. It will be in the Early Decorated style, and will consist of nave, with deep chancel, organ-chamber, and clergy and choir vestries.

A series of shops have been erected for a large drapery establishment in St. Mary-street, Weymouth. The buildings are Elizabethan in style, and have been erected from the designs of Mr. R. Crickmay. Mr. L. Bartlett was the contractor.

Messrs. Chubb and Son, the patent lock and safe makers, of Queen Victoria-street, E.C., will publish next week a reprint of the chief correspondence and newspaper articles connected with the recent controversy on English and American locks. The pamphlet contains a preface by Mr. H. W. Chubb, and will be forwarded free on application.

A new recreation ground is being prepared by the Marquis of Bute for presentation to the people of Cardiff, and is expected to be ready for the dedication in about two years. It adjoins the Sophia Garden on the side of the Taff, and is twenty-five acres in extent. The grounds are being laid out under the superintendence of Mr. Pettigrew.

New board schools at Gwernvach were opened by the Aberystwyth School Board on Thursday the 1st inst. The buildings provide for 650 children in three departments, the chief boys' and girls' rooms being each 65ft. by 20ft., and that for the infants 56ft. by 26ft., besides classrooms. The style is Gothic; the walls are of local masonry, with Forest of Dean stone dressings. The architect is Mr. W. D. Blossley, of Cardiff; the clerk of works, Mr. Ridges, of London, and the contractors are Messrs. C. James and Sons, of Bridgend. The cost has been £6 10s. per head.

Great progress is being made by Messrs. Henry Lee and Sons, the contractors for making a south entrance to the Ipswich Dock, in the preparations for the work. The engineer is Mr. Bateman, C.E., of London.

The Court of Common Council of the City have authorised the library committee to take the opinion of a Royal Academician as to the "artistic merit of a picture of Temple Bar," by Robert Dudley, now hanging in the corridor leading to the Guildhall library; and if the committee think after this that the picture is worthy of being possessed by the Corporation they are further authorised to negotiate for its purchase.

The vestry of St. George-the-Martyr, Southwark, are about to build baths and washhouses in the densely populated district of Lock's-fields, Old Kent-road. The plans have been prepared by Mr. Hiscox, surveyor to the vestry, and are estimated to cost £15,000. The principal baths are 93ft. by 28ft., and 45ft. by 25ft.

At a meeting of the Royal Hibernian Academy of Arts Mr. Stephen Catterson Smith has been elected a constituent member, Sir Frederick Leighton, P.R.A., a honorary member, and MM. R. Brunier, Otto Weber, and Victor Gilbert honorary foreign members of the academy.

The annual report of the Baptist Building Fund, presented to the subscribers last week, shows that during the past year thirty-four new chapels have been erected, containing 12,740 sittings, or 8,340 allowing for those in chapels pulled down. The land has cost £12,866, and the buildings £79,090. The outlay on chapels enlarged and improved has been £8,464, and 960 sittings have been added to the accommodation.

The parish church of Brewood, five miles from Wolverhampton, was reopened on Tuesday after partial restoration, from the designs of Mr. G. E. Street, R.A., carried out at a cost of £5,000.

The parish church of St. Mary, Woolwich, was reopened on Sunday week after the substitution of chairs for the old pews, and the removal of the upper gallery.

The Leicester Coffeehouse Company has accepted a tender at £2,943 for the erection of another new house. The architect is Mr. Edward Burgess.

At the last meeting of the sanitary section of the Glasgow Philosophical Society Mr. Alex. Frew, C.E., submitted a proposal for the removal of the sewage of Glasgow and the neighbouring burghs. The scheme consisted in conveying the sewage and rainfall, estimated at 136,782,000 gallons per day by sewer to the corporation ground at Dalnair, where the liquid could be treated by chemicals and the effluent passed to the river. The estimated cost of the works was £594,000, and that of maintenance, exclusive of treatment of sewage at £42,000. In the course of the discussion which followed Lord Provost Collins said "Glasgow must be prepared to lay before next session of Parliament a plan for dealing with at least a portion of the sewage of the city." Dr. J. A. Russell, of Edinburgh, followed with a paper on "Isaac Stone's Pneumatic Sewage System."

The Newry town commissioners on Monday raised the salary of Mr. Meares, town surveyor, to £125 a year.

Trinity Wesleyan Chapel, Harrogate, was recently opened. It is in the Early Decorated style, and has been erected from the designs of Mr. George Woodhouse, architect, of Bolton.

Sandgate Free Church, Ayr, after being decorated and partially reseated, at a cost of £1,500, was reopened on Sunday week.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. Discussion on D. Sturge's paper on "The Disposal of the Sewage of Paris," 8 p.m.

Society of Arts. Cantor Lecture, No. IV., "Recent Advances in Telegraphy," by W. H. Preece.

WEDNESDAY.—Society of Arts. Paper on "The Automatic Railway Brake," by E. D. Barker, 8 p.m.

THURSDAY.—Society of Arts. Sanitary conference. Civil and Mechanical Engineer's Society. G. W. Wilcocks, A.I.C.E., on "Roads and Roadways," 6.30 p.m. Society for the Fine Arts. Lecture by E. P. Loftus Brock, F.S.A., on "The Uses of a Collection of Ancient Engravings," 8 p.m.

Society of Arts. W. H. Perkin on "The History of Alizarine and Allied Colouring Matters," 8 p.m.

FRIDAY.—Society of Arts. Sanitary conference. Royal Institution. Professor Cornu, "Sur l'Étude Optique de l'Elasticité," 9 p.m.

SATURDAY.—Royal Institution. H. H. Statham on "Architecture." Concluding Lecture (No. 4), 3 p.m.

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Trade News.

WAGES MOVEMENT.

ALTRINCHAM.—The master painters of Altrincham have given notice to their employes of a reduction of wages of one halfpenny per hour, to come into force on the 1st November next.

BLAKEBURN.—The operative masons, bricksetters, flaggers, slaters, plumbers, glaziers, joiners and other artisans employed in the building trades have either resolved to strike against a reduction of 1d. per hour, or have ceased work already. The stone-masons will receive 12s. per week from the London Central Society, and the others will receive strike pay from the funds of their societies.

CHORLEY.—The joiners of this district struck work on Thursday in last week against the reduction of wages, of which notice was given by the masters six months ago. The reduction is at the rate of 1½d. per hour, with an extension of working hours to 55 per week.

GREENOCK.—The master plumbers of Greenock have intimated to their workmen that on and after the 10th inst. the wages will be reduced 1d. per hour.

HUDDERSFIELD.—The masons of Huddersfield having declined to work 54 hours per week, instead of 49½ as heretofore, and having also refused to consent to arbitration, have been locked out by their employers. They had offered to accept a reduction of 2s. per week rather than work increased hours.

LIVERPOOL.—On Saturday a deputation from the Liverpool operative plasterers waited on the masters for the purpose of coming to an arrangement respecting the reduction of 1d. per hour and an increase of five hours on the week's labour, which was proposed by the masters, and finally left, with the understanding that the operatives should continue working on the exact terms of the masters' first notice of 1d. per hour reduction, and also to commence work at six a.m. instead of seven, "under protest." The operatives will now receive about 5½d. per week less than formerly, with an additional five hours' labour per week.

MERIONETHSHIRE.—Notices reducing the working days to three weekly were posted on Monday at most of the Merionethshire slate quarries. The slate trade continues in a most depressed condition.

WIGAN.—The Wigan painters are dissatisfied with the award of the arbitrator on the reduction in wages proposed by the masters, and did not commence work on Monday. The notices by the masters were that the week's work should be increased from 49½ to 54½ hours, and the rate of wages reduced from 8d. to 7d. per hour, and the arbitrator decided that the hours should be 54½, and the pay 7½d. per hour. The masons, plasterers, plumbers, joiners, and carpenters are still on strike. The joiners have offered to accept either of the following rates: 49½ hours at 7d., or 54½ hours at 8d., but the masters refuse to entertain either. The painters have requested their employers to reopen the arbitration with reference to their rate of wages. The masters, however, at a meeting on Monday afternoon, declined to do so, as they saw no reason for that step being taken.

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THE BUILDING NEWS.

LONDON, FRIDAY, MAY 16, 1879.

DOORS AND DOORWAYS, ANCIENT AND MODERN.

THE South Kensington Museum has acquired, by purchase, a marble doorway from one of the old Genoese palaces, the reputed work of L. da Romero da Campione, bearing date A.D. 1519. Such acquisitions would be all the more valuable did they lead to a deeper practical study of the ways in which those ancient Italian workers made their edifices, not merely splendid but artistic also. In few respects has the genius of inventive and constructive nations and ages been more characteristically illustrated than in their fashions and mechanisms of gates, doorways, and doors, of which, perhaps, the most superb modern illustrations are to be found in the double malachite valves, from the Ural, adorning the Winter Palace at St. Petersburg. A palace, as distinguished from a public edifice, is, of course, a private building, and the degree of luxury represented by its splendour is never more distinctly apparent than in its approaches. Whether, however, in palatial or in humbler dwellings, the door and doorway always constituted among our ancestors important appendages, constructed of various woods, carved, moulded, painted, set, as it were, in frames of decoration, occasionally of almost architectural effect, though the material was only pine, or oak, or ebony, held together by Gothic-headed nails and iron braces. In the older Spanish mansions we find a still greater dignity given to the means of entrance, and, singularly enough, their arrangements very closely resemble those of Herculaneum and Pompeii. There is a hall, with one door opening on the street and another opening on an interior court, the latter of wood or of thin iron, the former of massive wood, enormously heavy, but nearly always wide open during the day, and studded with nails, diamond, square, or round-headed, but invariably turned into one form of decoration or another. It was upon their doors and gates, indeed, that the elder race of Spaniards expended most of their marvellous facility in iron-work. In parts the details seem to have been hammered and in parts chiselled, but upon all the traces are to be detected of Moorish teaching. Singularly enough, however, the gate of the Pantheon at Rome, to this day almost intact, and the only one remaining from antiquity with all its accessories perfect, exhibits similar features. Each of the bronze nails with which it is studded, and which, apart from a low moulding, constitute its sole ornament, is a piece of decoration in itself, with heads representing sun-rays, jewels, and so on, in such elaboration as to become a study. The Pantheon, indeed, of all the Roman structures, was that in which this adornment of bronze was most profusely employed, and in the portals especially. But that, of course, was a national edifice, to which attention has only been for a moment diverted from the family castles, so to describe them, of the feudal age. These were rarely remarkable, in any sense, as works of art, and the celebrated one of Aiguo-Montas may, perhaps, be taken as typical of them all—reproduced as we find it at St. Vicente in Spain, the Mediæval market-place at Brussels, and the Tower of Narbonne—a low-browed arch, leading to another rather more airy, always studded with nails, sometimes plated with iron,

occasionally armed with a portcullis. But these were rather military than domestic gates and doors; and, indeed, the variety of such construction is a large one, for architects have bestowed infinite care and thought upon the apertures, especially of sacred interiors. Those in bronze, of St. Sophia, at Constantinople, have always been regarded as masterpieces of art, with, scarcely less so, those of the tabernacle in the church of St. John, at Flens, in the same material; of St. Mark's, Venice; and the Abbey Church, St. Denis; and, in a word, of St. Sabine, at Rome. London, of course, has long forgotten its gates, except in so far as they are commemorated by the names of streets and thoroughfares, as Ludgate, Bishopsgate, and so forth; but the English never lavished such love upon these works—though many of our cathedrals exhibit good testimony to it—as did the builders of old days, and of the Italian palaces, more particularly those of Genoa, Florence, and Venice. Still, rich in luxury as were these structures, they never brought forth so elaborately the genius of the early builders as did the more religious and monastic constructions of an age coeval with them. But even here, periods of manners, not less than of arts, pass across the perspective. It was considered an extraordinary fact that the gates of Lorient, of the convents on Mount Athos, of the abbeys Cluny and Jumièges, of the Convent of the Holy Fathers at Auxerres, of the Brothers of the Redemption of Slaves at Rome, and of the Cathedral of Marmontier were unfortified, while those of Ivron, Tournours, St. Peter of Barquell, St. Baptist of Laon, and St. Martin d'Anchy, under the name of gates, were so many fortresses, with towers, barbicans, covered ways, and every preparation of defence. Yet, almost at the same time, we have houses of sanctuary so respected, even by the brigand classes, that their doors of solid silver, or other metal, thickly-gilded, were left unguarded by night.

Art, among its imaginations, has seldom put them to a more varied use than in the architecture and materials of gates. It has given them endless forms—in Latin and Gothic churches, in Greek and Roman dwelling houses—in cathedrals and at the entrances of cities; in the shape of triumphal arches; for palaces and castles, for cemeteries and catacombs. It has made them of marble, granite, bronze, ivory, malachite, silver, and even gold, of maple, mahogany, oak, and cedar. At Grotto-Ferrara, near Rome, was recently discovered a magnificent portico, with doors of bronze,—though some were of wood moving on hinges, and covered with plates of silver, while others belonging to the basilica of St. Mary the Great were of silver, solid. Those of St. Constantine are plated with the precious metals, damascened in semi-Oriental patterns, while those of St. Sabine, already referred to, are of wood, but literally pictures and frames of sculpture, in designs admirably followed in St. Anne, at Paris, and in the modernised porch of the Cathedral of Rouen. This last, however, exhibits some features of its own worth notice. It is of oak, panelled, with a border of sixteenth century arabesque, exquisitely carved, but unhappily daubed over with paint. The architect originally employed recommended filling up the crevices with gun, and laying a light cover of oil upon the gun; but he was superseded, and another revivalist engaged, who daubed the delicate surface with a legend, in abominable colour, of the Tree of Jesse. Still, nothing can disgrace the beautiful forms of the jambs and lutelets, of the birds and cherubs, of the flowers and plants, wrought originally in the virgin oak. In its proportions, however, though the enrichment be Gothic, this doorway precisely resembles that which has just now been brought from Genoa, and another belonging to the Church of St. Mary-the-Great, at

Rome, in wood, plated with bronze, and having projecting piers, with figures of lions, in cast metal, recumbent upon them. The porch, however, must not be confounded with the gate. The former has, in all epochs, and under every dispensation, afforded an opportunity of interminable decoration and display, while, of the latter few examples remain to contest the palm of excellence with those of Gioberti. Nor, again, must a gate be confounded with a door, and of this we have two interesting illustrations belonging to the olden time, one from Germany, and another from France. The former opens upon a suite of ground-floor rooms in the Grand Ducal Château of Baden. It is in perfect consonance with the rest of the structure—a world of wooden architecture, overlaid by one of stone—of timber roofs, of carved panels, of oaken mouldings, of unconcealed rafters, of coffered ceilings, of sculptured or moulded friezes, and, consequently, of doors to match—lofty and heavy, with a ponderous transverse bar half-way down, occasional inlays of walnut, pine, and ebony, a lock of monstrous size, and hinges covering a third of the surface. The latter, lately unearthed at Toulouse, is of uncertain date, folds back on either side, is very simply carved, and, to all appearance, was painted of a natural white. Both of these, however, are confronted by the design of a French architect, César Daly, who wrought the noble gates of the Hotel Demidoff, in Paris. He boldly lays it down as an axiom that in the construction of gates bronze is almost the only proper material to be employed. The Egyptians understood its value; the Greeks constructed a temple with it three centuries before the first stone of the Parthenon was laid; the Romans roofed their festal halls with bronze. More to the purpose is the fact that the doors of Notre Dame and of a hundred other shrines, celebrated throughout the civilised world, are thus composed, together with the famous Grille of St. Germain l'Auxerrois; but the Demidoff gates are actually of hammered iron, finished off with cast-iron ornaments, perforated into patterns while red-hot, manipulated to an extreme fineness, and yet of marvellous strength. Another door, the preservation of which is due to the same artist, is that of the Abbey of "St. John of the Cabbages," in the valley of the Lower Rhine, eight or nine centuries old. The work is supposed to be as old as the edifice itself, or, at any rate, exemplifies the highest state of the art as it existed in the first half of the twelfth century, when it had been comparatively obscured during the process of a long decline. It is composed of upright planks, set in a frame of solid stone, and it was once ornamented and strengthened by metal circles and scrolls, partly symbolic, and most ingeniously wrought together. Some of this antique metal work, when analysed, is really amazing, on account of its perfection in detail, and thorough originality in the idea. Schweighouiser, in his book on Alsace, declares that there are parts of it which would literally bear examination by the microscope, and yet it was hand-work from beginning to end. The relics in wood, however, belonging to this class are not the less worth examination. That attached to the Sacristy of Rouen Cathedral—a thirteenth century specimen—is a marvel of simplicity, elegance, and that kind of character which throws a halo round every variety of ecclesiastical art. The wooden doors, indeed, of the twelfth and thirteenth centuries are well-deserving of notice from every point of view. Sometimes they were constructed of simple planks placed upright, side by side, carvel fashion, and held together either by transverse pieces or iron bracings. But they had to be hung, and their hangings had to be socketed in the stone, and, by degrees, this furniture had to be made, in its way, ornamental, whether by

bevellings of the timber, or ramifications of the iron-work upholding it, and so branches, fruit, flowers, emblems, and an entire allegory of mediævalism grew upon the rough surface of the iron. The Cathedral of Rouen, in fact, affords several examples of Middle Age doors, in the construction of which iron has an important part. Some of them, however, have been modernised and vulgarised of late, and the hammer of a nineteenth century blacksmith has, in various instances, broken away a piece of work of which Quentin Matsys himself might have been proud. Still, the great door of Rouen retains its character, notwithstanding the coarse coat of paint by which it has been both discoloured and disfigured. The joints between the planks, it is true, are no longer to be distinguished; the locks and bolts are battered, but the ring hangs in its place; and the circular ornament, for which no one has ever yet found a meaning, is, strange to say, untouched. This door is in itself, says M. Daly, "a lesson in architecture," and certainly nothing can be at the same time more simple and more significant. These are principles we find repeated in the gates and doors and doorways of Chartres—not long ago destroyed by an incendiary—of Florence, Palermo, and Perugia, the three last being of richly sculptured marble, in close resemblance with that lately brought from Genoa to South Kensington. The singularly high and narrow entrances into the palaces and churches of Anay-le-Franc, the market gates of Brussels and of Berne, the castle gates at Cadaillee and Gaillon, with the more curious gates of Lisbon, suggest much that is remarkable, as exemplifying so many fashions of taste, if not so many schools of thought. In the East, of course, where the word "door" is mentioned it often means no more than a pair of curtains, but, taking the term literally, it may still have a number of different applications, as in the Latin Gate of Rome, the War Gate of Rheims, the Gate of France at St. Martin-le-Vinoux, the doors of the hôtels Cluny and Sens, and the Mycenaean, Ephesian, and Nicaean gates. In Turkey, we know, the "Porte" originally signified the entry to a palace, though it has since become a synonym for the Government of the Ottoman empire; but these translations from the real to the figurative belong only to the East, and although in a poem "the ivory door of dreams" may be tolerated, the solid interest of the subject begins with the entrances provided in past and present times, whether for cathedral or church, palace or prison, Gothic castle, or ordinary modern abode. The gate or the door figures largely, as we have said, in the chronicles of both arts and manners in every civilised country. Moreover, a wonderful literature connected with this sole subject, neglected though it be in modern days, exists.

THE CONSTRUCTION OF THEATRES AND MUSIC-HALLS.

SOME regulations for the better construction of theatres, music-halls, and other like places of resort, and for the protection of the public frequenting them, have been talked of repeatedly within the last few years, and now we have the first instalment towards a code of regulations issued by the Metropolitan Board of Works under the Metropolitan Management and Building Acts Amendment Act, 1878. The new regulations were made at a meeting of the Board on the 2nd inst., and comprise seventeen clauses in all. These we may briefly notice, confining our attention chiefly to those which have most direct bearing upon the planning and construction of buildings of the class referred to. The proprietors and stage-managers of theatres and music-halls are essentially conventional in their habits and thoughts; hence

we have been accustomed to see, despite the repeated casualties from fire and panic, the auditorium of a theatre built in the flimsiest manner, while behind the proscenium the materials and construction are of a still worse description. Wooden partitions not unfrequently divide the passages and gangways, while drapery and tinsel of the most inflammable kind conceal the temporary expedients on the stage. As regards planning, the theatre does not admit of much that is new. Its shape has to be governed by the primary conditions of sound and vision, while its size or accommodation is regulated in like manner by the width of the stage opening. It is essential that the part of the house which directly faces the stage should be within a moderate distance, say, 60ft.; that the shape should be either based on the isacoustic curve, or upon the conventional horse-shoe form, and that the usual passages and staircases should be placed in positions to provide for the readiest ingress and egress. But though the plan does not admit of much invention, the construction calls for a thorough reform in details at least. The Regulations now before us apply to all "places of public resort within the metropolis for the performance" of stage plays, and "to all houses, rooms, or other places containing a superficial area for the accommodation of the public of not less than 500 square feet," so that a room of 25ft. long by 20ft. broad can be brought under these restrictions if it be opened or used for public dancing or other entertainment under authority of letters patent or licensed for such purpose for the first time after the 22nd day of July, 1878. Regulation II. requires that henceforth every person who is desirous of opening a house or place of entertainment or resort within the metropolis, or any room of not less than 500 square feet, shall give notice of his intention to the Metropolitan Board of Works; and it further requires that plans, elevations, and sections of such house, room, or place of public resort, or of the premises of which such may form part, drawn to a scale of not less than $\frac{1}{4}$ th of an inch to a foot, and a block plan showing its position in relation to adjacent premises drawn to a scale of not less than 1 in. to 20ft., must be submitted to the Board. It recites "In the case of new buildings, or buildings to be adapted as a place of public resort, these drawings must be also accompanied by a specification of the works to be executed, describing the materials to be employed and the mode of construction to be adopted, together with such other particulars as may be necessary to enable the Board and its officers to judge whether the requirements of these regulations will, when the building has been completed, have been complied with." The notice has also to be accompanied by a "detailed statement of the respective numbers to be accommodated in the several portions of the house or other place, and of the area to be assigned to each person, which shall not be less than 1ft. 8in. by 1ft. 6in. in the galleries; nor less than 2ft. 4in. by 1ft. 8in. in the other parts of the house, room, or other place of resort." No one can complain of these requirements in ordinary cases; a statement of the nature of the interest in the premises of the person applying, and the schedule of numbers to be accommodated, and the area assigned to each, seem to us to be highly necessary to insure public security in these buildings; but there is one point about which architects will have some reason to complain, namely that quoted by us above, in which a specification of the works to be executed and other detailed particulars are to be submitted. Why should an architect be subjected to this kind of control? In some instances such an ordeal would be simply preposterous; it would be a tacit admission of the superior skill and experience of the officers of the Board—an assumption that may be quite unwarranted, and which

many architects who had built theatres could fairly resent. We may suggest therefore the words in parenthesis, "unless an architect be employed," ought in justice to be inserted in this part of the clause. We contend that the submission of the plans and sections of a building would, or ought to be, when a respectable architect was engaged, ample guarantee for the conscientious use of good materials and proper modes of construction adopted. The area to be allotted to each person in the gallery is a trifle over 2 square feet, and to each person in the other parts about $3\frac{1}{4}$ square feet—areas that at present are not attempted in the majority of London theatres. We believe 2 square feet to every grown-up person a not very ample allowance for passages and stairs, but the space allowed in the regulations is ample. Capt. Shaw has laid it down that for every hundred persons accommodated, the passages, halls, and stairs should not be less than 250 square feet. The regulation touching walls is that every house or room shall be inclosed with external walls of brick or stone, or partly of each, and the thickness to be not less than that prescribed by the Building Act for walls of similar height and length of the warehouse class; the proscenium wall of any house is by Regulation IV. to be of brick not less than 13in. in thickness, carried up to a height of 3ft. above the roof, and carried down below the stage to the level of foundation of external walls. Only a doorway into the orchestra and one doorway on each side of the stage, for communication with the auditorium, are to be made through it; these are to be not more than 3ft. 6in. wide, and to be closed with iron doors fixed without woodwork, and the decorations of the proscenium are to be of fire-resisting materials. We hope the last provision will give rise to a better and more truthful mode of stage decoration. Regulation V. provides for the support and inclosing every staircase for the use of audience by brick walls; and all staircases and floors to be of fire-resisting materials. It also provides that:—

"No staircase, internal corridor, or passage-way, for the use of the audience, shall be less than 4ft. 6in. wide. Every staircase, corridor, or passage-way for the use of the audience, and which communicates with any portion of the house, intended for the accommodation of a larger number of the audience than four hundred, shall be increased in width by 6in. for every additional 100 persons, until a maximum width of 9ft. be obtained. Provided always that in every case where the staircases are 6ft. wide and upwards a dividing hand-rail shall be provided.

"A clear passage or gangway, of not less than 3ft. wide, shall be reserved round every part appropriated to the audience, except that next the proscenium or place of performance."

These are wise precautions, and will do much towards promoting roomy places of amusement, and in allaying public fear. No. VI. is to the effect that all ironwork is to be protected against the action of fire, but the means are left to the Board. The VIIth clause treats of means of exit, and provides that wherever a portion of the audience is "accommodated over or at a higher level than others of the audience, a separate means of exit of the width prescribed for staircases or passages, and communicating directly with the street, shall be provided from each floor," separate tiers of boxes are consequently reckoned together as forming one floor, and one additional exit at the least, communicating with different levels and directly leading to the street, is to be provided. All doors and barriers are to open outwards.

Sanitary details have not been overlooked. We find that as regards warming, hot-water only at low pressure is to be used where artificial heating is employed; that all openings for ventilation shall be shown on the plans and described, and be subject to the Board's approval; that no workshop, &c., shall be formed over the auditorium or

under it; no scene-dock or property-room to be permitted within any house unless separated by fire-proof means; that where there are no fire-mains on constant supply two cisterns shall be provided on top of the proscenium wall, or at some approved place, each capable of holding 250 gallons of water for every 100 persons, and fire-mains in connection with hydrants to extend round the whole building; and that no white metal pipes are to be used in any part of the building. The concluding regulations require notice to be given to the Board of any intended alterations or additions to any building in respect of which the Board may have granted a certificate of approval. The notice in such a case is to be accompanied by plans, elevations, and sections, showing the proposed alterations, and also by a specification; but here again we cannot see why the latter document is to be submitted in every case. The Board, however, intimates in the last clause that it may in certain cases "dispense with or modify its regulations," that applications with this object are to be in writing and state the reasons why such modifications should be made.

These regulations, of which we have here given the purport, will, if enforced with moderation and a due regard to the last clause, produce a very beneficial change in buildings of this class. Up to the present time, notwithstanding the rules issued by the Lord Chamberlain to be observed by the houses licensed by him, there has been a deplorable disregard of common structural and sanitary precautions. The proscenium-wall and the separation of the auditorium from the stage itself has not been considered with any care, passages and staircases have been constructed without any independent support and safety of their own, openings for exit have either been absurdly inadequate to the accommodation of the house, or so badly placed that loss of life is rendered almost imminent in case of emergency; doors are made to open inwards, while every means of ventilation is neglected or rendered abortive by the desire to prevent draught. We believe that the adoption of such judicious regulations without unnecessary restrictions would bring about a desirable change in structures of this kind, not only promoting more substantial buildings, but creating an inducement for more truthful architectural decoration.

THE PICTURES AT THE ROYAL ACADEMY.—II.

ERNEST CROFT'S picture (No. 613) of the "Evening of the Battle of Waterloo," is, in all respects, a satisfactory representation of what might have taken place at that momentous time. The moment chosen is when Napoleon is quitting his carriage, which he did in such haste that he left his hat behind him, to be found by the Prussians who took possession of the carriage and its contents a few moments after he had quitted it. The painter represents him as just about to mount a horse, brought by one of his officers for his escape. The gunners to the left have just limbered up and are off, while the guards to the right are heroically struggling to keep back the coming Prussians till the Emperor has gone. It is a stirring incident which has lost nothing by Mr. Croft's vivid interpretation. There is an immense variety of expression all naturally given. The subject, though some of its details are doubtful as facts of history, is adequately treated. Elizabeth Butler (*née* Thompson), shows her usual power in "Listed for the Connaught Rangers," recruiting in Ireland. A sergeant, accompanied by a couple of other soldiers, and a drummer-boy, are marching along a heavy road to join headquarters, with two recruits of different dispositions, through a desolate out-of-the-way Irish moor. The man on the left looks back

wistfully at his distant home, while his companion steps out boldly and carelessly, leaving no cheerful memories behind. The aspect of neither escapes the watchful eye of the sergeant who marches between them. By no means the worst part of the picture is the excellent landscape through which the party passes. Utter desolation, well-nigh without hope, is the portion of "The Penitent," by Luke Fildes (No. 63), returned to the home she left in her infatuation. It is shut up and deserted. There she kneels with head buried in her hands, with broken heart, yearning for comfort. How likely she is to get any from her former neighbours may be guessed from the groups of gossips about the place; even the children are more inquisitive than compassionate. The prosperous farmer on his big cart-horse, with his little boy upon him, will in a minute have passed on with no more than a cursory inquiry. There is plenty of interest, however felt by the women of the village. That ugly old crone at the back and the buxom farmer's wife who is haranguing the bystanders, have nothing too bad to say of their erring sister. Each of them could have told long ago "what was to be expected of a girl like that." But she heeds them not; her grief and shame are too absorbing. Perhaps it would have been better if the man and horse had not formed quite so important a part of the picture; but no doubt the artist intentionally and rightly put the erring sister somewhat in the background, the better to express her lonely situation; for, after all, the subject of the picture is not only the return of the Penitent, but how little pity is extended to an erring sister, however bitterly she does repent, and however much she tries to amend. Of a very different character is the wretchedness of the poor fellow drawn by Mr. Weeks (No. 76). His better half and her old servant are having a thorough clean-up to their hearts' content. Well may he exclaim, "Oh wretched day, beyond expressing! to me a day the most distressing. This slopping." He does not get much pity from his partner in life, as he sits perched on a piece of furniture to get out of the wet, her cheerful raillery only adding to his misery; the hopeless confusion of the furniture heaped up any how completes the whimsical scene. H. T. Wells exhibits a delightful couple of fair young ladies in the "Laurel Walk," (No. 331.) Though they alone are seen strolling among the laurels which shade them from the sun, there are doubtless others beside them in the grove, unless their bright eyes mislead us, though the elder of the two pretends to be so interested in her book. "The Old Stone Breaker" (No. 55) is also good, though rather wanting in life. P. H. Calderon comes out this year chiefly as portrait-painter with a fair amount of success. Family groups with fancy names seem to be coming into fashion, with the inevitable result that nearly all the people seem to be trying to look as if they were not having their portraits taken. Thus in 268 the wife and children of C. J. Lambert are made to pose in "A Voyage Round the World" as listening, though most of them are not, to an interesting tale. It is also all but inevitable that in such compositions the same sort of idea will strike many artists, and so in the present exhibition there are three of this description. As portraits of a charming mother and sweet little girl just come in from a walk in the flowery meadows, A. D. Leslie's "Alice in Wonderland" (No. 72) is delightful. Mr. Leslie's last picture is "Naughty Kitty" (336.) This also has only two figures, mother and daughter in a quiet garden. The expression of Mrs. Puss, not quite without anxiety as she watches the child trying to make little Kitty good by her caresses, is very natural. G. E. Hicks exhibits the third similar and well-painted group of a

mother reading to her children. "Twilight," (No. 325) by P. H. Calderon, is scarcely up to his usual high standard. There is no lack of spirit and incident in A. C. Gow's "No Surrender." After a desperate fight, how desperate can be seen by the wounded and dying; a small band has retired into the very roof of the building. One resolute warrior stands with his gun pointed to shoot the first man that tries to prevent his comrades from pulling up the ladder through the trapdoor, and so cutting themselves off from immediate attack. None of those brave fellows will be taken alive. Eyre Crowe's most meritorious work is No. 301. Marat, as was his wont, is represented as seated in his bath, over which a board is placed, writing his correspondence. Charlotte Corday, had tried vainly two or three times to get admittance. At last he heard her voice and ordered her to be called in. After interesting him by giving him the names of certain Girondist deputies in exile at Caen, which he took down to have them brought to the guillotine, "she stabbed him with a knife which she had concealed for that purpose." It is not the death itself that is described, but simply her entry into the room. Marat, with his wicked face, turning round in something of suspicion and fear to receive her, but is calmed by the steady quietness of her demeanour. (201) "Bluecoat boys returning from their holidays" is a pretty picture; but we do not care for either (443) "The Execution of the Duc d'Enghien in 1804," which is too low in colour and tame, or (1041) "The Queen of the May," a bit of common life which could only be redeemed by very skilful and characteristic treatment. No. 1039 is a wedding scene of the middle of last century. The time is winter, the snow lying thick upon the ground, the young bridegroom has just mounted and is holding his bride before him, seated on a pillion; round them, mounted, are the squires of the neighbourhood, while the peasant girls are giving them a farewell greeting. The old father and mother stand, sorry at their own loss, at the gate to see the last of their darling. Seymour Lucas's "Gordon Riots" (No. 25) puts one in mind of the pictures Copley loved to paint. The enormities committed by the mob are hinted at by the collection of valuable furniture and objects of art heaped in one corner of the street among the dead bodies, probably of some of the robbers. Amid burning houses and the tremendous roar of the authors of those horrible scenes which disgraced that extraordinary time of anarchy, the Riot Act having been read by the worthy magistrate who rides in the midst of the soldiers, and whose alarm is well contrasted with the quiet coolness of his professional companions, the mob at last is brought to bay by the platoon fire of guards. There is great breadth and character in the "Breton Quarryworkers" (No. 123), by G. F. Munn. There are few better bits of drawings in the collection. The next picture, "Adversity," by T. Sant, is too well known to need any description; it is a most beautiful work. All of H. W. K. Davis's landscapes are good. "Cutting Forage on the French Coast" strikes us as one of the best: it is a harvest scene by the seaside, the tide coming in fresh and brisk. Three fine horses are enjoying themselves in the rich grass till wanted. The finish of the foreground, with its poppies, clover, daisies, and various grasses, is as high and true as possible. Country of a very different kind, but equally well transferred to the canvas, is shown in No. 615, where a white cow and calf, admirably painted, have strayed in the moorland. No. 935, "Picardy Sheep," should not be passed over. Of his English scenery the best is (No. 1,396) "Cloud and Sunshine." Rich, fat, slightly undulating pasture land; the summer storm having just passed over and left the green glades greener still; the

bright hot sun making all brighter now that the dark clouds are scudding away, much to the contentment of the flock of rooks who have just resumed their work. The landscape by the door on the opposite side of the room, "The Woodland Road" (1,400), by J. W. Oakes, is a fine robust drawing of oak-eland country. In all the more elaborate landscapes, especially those of the rising school, such as have been purchased by the trustees of the Chantrey Trust, there is a tendency to exaggerate the spectroscopic effect, so much so that the trees in the foreground seem in most cases to come right out of the frame, suggesting, perhaps wrongly, a liberal use of photography. Henry Moore, in "By Stress of Weather" (No. 75), has a splendid and most refined drawing of rough water, the boats just entering harbour having enough to do to hold their own with the growing waves. The tone of colour is subdued, according to the limits that this refined artist has imposed upon himself. "Calming Down" (No. 116), is also well worthy of notice. All the pictures exhibited by J. C. Horsley, except No. 168 "A Trespasser," are portraits. This is a very pretty picture. A very grand madam comes in from her drive, and upon entering her bedroom, where her dress, of most gorgeous description, is lying on the snowy bed, poor tired puss has made herself particularly comfortable in its folds, which she has arranged suitably for the purpose, more to her own satisfaction than that of her mistress. Mr. E. Nicol always gives some humorous examples of character. His "Interviewing a Member" is an excellent instance. The unfortunate member, who is dressed in pink ready to start with the hounds has to endure the prosing of the farmers and others of his village, keeping his temper as well as circumstances will allow. The meeting evidently have no idea of hurrying themselves, so that he might just as well be seated. It is needless to say that the details of furniture, dress, &c., are all conscientiously and faithfully worked out, to the corduroy and pearl buttons of the deaf old fellow who is standing in front. Old Shippers would not seem at first thought a very promising subject, and yet Charles Robinson has made an amusing, and in some sort beautiful, picture of the "Shoes of the Faithful." All these taken off the feet of the men who have entered the Mosque to pray, are arranged in quaint order in the Vestibule under the guardianship of a fine Persian cat and her two sleepy kittens who enjoy the nice warm corner. Through a beautiful lattice-work screen we get a peep at the blue sky and flowers of the temple garden. T. M. Rooke's series of incidents in the life of Ahab (967 to 992) are finished with the elaboration of mediæval miniatures. They show an intimate acquaintance with the minutest details of Assyrian costume and architecture, so far as they have been made known to us by the discoveries at Nimroud, &c., and considerable success in their adaptation to a well known history. The representations begin with Ahab's wanting Naboth's vineyard, and end in his wife's body being east to the dogs in the same spot. "St. Simeon Stylites" (1,005), by G. P. Jacob-Hood, is well imagined. We cannot say as much for C. W. Cope's "Country Club Meeting in the Old Time," where all the guests, listening to the tale of the wit of the village, are meant to be laughing, but are really made uniformly to grin idiotically. It is not every one who can draw a tolerable laughing audience. It was almost too much for Hogarth. The best figure is that of the storyteller himself, whose back is turned, and so most of the humour is left to the imagination. The table-cloth hangs in such massy folds that it might, if it looked like anything but thick paint, be made of quilted blanket. There is not much doubt of the correct verdict to be pronounced upon the "Fox

Terrier" (No. 1374), by Percy Macquoid, though the evidence is only circumstantial. If the remnants of the lobster are not enough, his look will condemn him, and so would that of the Absconded One, by Frank Holl, (No. 1385). We should doubt if many men who run away ever feel such anguish—suicidal, one would think, in its determination—as is expressed in the unhappy occupant of the 1st class carriage in the Dover express. Ruined in love, in fame, and for fortune would be a better title. The agony is piled on rather too heavily for anything less. Notwithstanding much that there is undoubtedly worthy of praise in R. W. Macbeth's "Sardine Fishery" (1,430), we cannot altogether admire it. There is absolutely no transparency in the water, and the surface is very imperfectly rendered. Still there is a good deal of freshness and life about the whole scene, the boats going out, the women mending the nets, stopping their work to bid a cheerful good-bye to their friends afloat; the disgust of the young fellow prevented by his injured arm from going with his comrades. Mr. Macbeth also exhibits several etchings.

ARCHITECTURE AT THE ROYAL ACADEMY.

(THIRD NOTICE.)

IN resuming our notes upon the architectural drawings in this year's Academy, we may remark the very temperate character of most of the domestic works. Among these we may mention Mr. Ewan Christian's "Glyndebourne, Sussex" (1,068), a well massed red brick and tiled house in Late Gothic, pleasingly exhibited in a water-colour drawing. The design shows some additions to a house of remarkably quiet pretensions, the grouping, windows, and gables are all of a character well known to the student of our Domestic Gothic. We have already remarked upon another house just below it (1,069) in a less commonplace style, and we now turn to (1,074) "Harestone, Caterham, Surrey," by Mr. John Sulman, in which a thoroughly Domestic type has been handled with considerable freedom and breadth, notwithstanding the introduction of certain features of a questionable kind. The broad and quiet rendering of the brick walls and stone bay windows of return front has been spoilt by a queerly-placed band of stone, too low to form a necking or an impost, and by the enthipped treatment of the gable ends. There is much to commend in the drawing and colouring, which have a sharpness and delicacy that add to the effect. Mr. R. W. Edis also, in his "New House at Eastbourne," the porch of which we illustrated last year, has not ventured out of the safe but beaten track of English Domestic Gothic. His new house is in red brick and stone, in a sensible and freely-treated kind of Elizabethan; the grouping is good, but the details of entrance side hardly appear to harmonise with the very plain and almost commonplace front. We take this work as it is to be a commonsense treatment for a country house, in which no attempt has been made to be either quaintly picturesque or *negligé*. Contrasting with these, we note several attempts at half-timbered buildings, which the old Kent and Sussex houses have rather suggested than inspired. Mr. John Robinson's "View of Willey's—at Heath, Kent" (1,096), in a rather faint ink drawing that scarcely does justice to it, is more clever in the grouping of parts than it can be said to have seized the true *motif* of the timbering, while the broken gable in the return front does not commend itself as a particularly happy mode of roofing the projection. Turning to Messrs. Dodgshun & Unsworth's design for "Shepherd's Spring, Hants" (1,116), we notice a large house in which the timbering is carried to an excess in the upper story, and the authors appear to have lost

sight of the structural value of framework altogether, in introducing a series of timbers placed anglewise at the lower corners of their gabled projection. These, and the cutting up of the brick chimney shafts with vertical prismatic-shaped arrises, produce an unmeaning character to an otherwise good design in which we notice in pleasing contrast a very well treated arched porch. If the feeling which is displayed in the solid basement of this building had been carried up a much better result might have been obtained. No. 1,130 shows a "House in the Third Avenue, Brighton," by Mr. W. Galsworthy Davie. All that we need say of this design is that it is a pleasing variation in red brick upon the monotonous white brick and stucco residences of a rising suburb of Brighton, though we can hardly understand the shield-like patches between the windows. Mr. T. E. Collett, in his "Houses at Wandsworth" (1,138) adheres to the kind of Renaissance which he has successfully worked in of late. In the present instance there is an unpleasant broken appearance about the gables: the centre scarcely seems to belong to the wings it is so low, and a little more connection between the parts is needed. In Mr. Collett's hands the style has certainly elements that may be turned to account. There is certainly nothing in it approaching the daintiness or humour we find in Messrs. George and Peto's, or Mr. Shaw's work, nor, on the other hand, can we find fault with anything that is cold, hard, or meagre; at all events, we regard this treatment of the style as one adapted for large houses in stone or brick localities. It is essentially a distinct phase from the half-timbered style before mentioned. Mr. Collett's "Three Lodges" (1,093) are exceedingly picturesque studies, and drawn with considerable care and feeling. We may just mention two other designs for country residences: one is a design by Mr. J. Langham, illustrating what we have before remarked regarding the excessively restless and fidgetty striving to produce variety, even by artists of Mr. Langham's *calibre*. The parts of the house seem to wrestle with each other, and though clever in detail, there is a painful sense of crowding and unquietness. In the small plan which accompanies the design, we fail to remark any special skill, and the entrance and hall are not happy. Yet the drawing quite sustains the author's reputation. The other work is "The Grange, East Sheen, Surrey" (1,175), by Mr. E. Ingress Bell, where there is decided repose and good grouping of parts, though comparatively little that is striking in feature. We notice, however, a difference in the treatment of gables, a source of variety, we may remark, that has become a positive weakness in the hands of many young architects. In another direction, we notice Messrs. Dunn and Hanson's view of St. Gregory's Church, Monastery, and College, at Downside (1,081), in that particularly safe style of Gothic about which there can be very little said, and certainly nothing to object to. The bird's-eye view is very well drawn, but hung rather high for examination; the grouping is skilfully managed, and the detail we can well take on trust. No. 1,088 attracts notice by its vigorous drawing rather than by any great merit that the design possesses for its purpose, though we must acknowledge a thoroughly artistic, if rather wild, French Gothic feeling in the massing and details. It is merely an academic sketch, being the design for a "Convalescent Hospital on the sea coast," by Mr. Eldon Deane, and as such it certainly forecasts some good work from its author, evincing power in composition if not in adaptation. A very pleasing sketch of alteration and additions to "St. Mary's Church, Monmouth," is exhibited by Mr. Street, R.A., the new chancel of which, with its richly traceried window, the transept end, and side aisles are grouped together in a charming

manner. A few water-colour sketches demand notice. Mr. Wyke Bayliss sends two rather heavily coloured interiors, one (1,090) of "Trèves Cathedral," and the other (1,105) of "Strasbourg Cathedral." They are both the work of an artist, though scarcely architectural drawings. Mr. Aitchison's "Interior of St. Mark's, Venice (1,085), is a rather washy-looking drawing, feelingly done but wanting in decision of detail. Perhaps one of the best interior drawings in colour, is Mr. F. W. Suggate's "Interior of Henry VII. Chapel" (1,070), a rich piece of colouring of great depth; a little too black perhaps, but conscientious in drawing. Another clever sketch by Mr. Street represents the north-east view of Holmbury St. Mary Church, Surrey (1,107). It is a very picturesque type of a village church with a low shingle spire, broached, a simple row of lights appearing round the low tower, also apparently of timber. The deep chancel and a gabled end to the aisle have been skilfully adapted to the sloped ground. No. 1,104, "The Grand Staircase of Shakespeare Memorial, Stratford-on-Avon," has a more than usual interest just now, and the drawing of the architects, Messrs. Dodgshun and Unsworth, although hung high, shows the staircase doubtless at its best. Exception must be taken to the flat arch of hall through which the view is taken; also the series of pointed arches that form the side or ramp of the stairs has the effect all Gothic areading has when adopted for interiors. It looks weak and strained, though the detail appears excellent, and the drawing is quietly coloured. Hung rather low are two interior views in sepia of "Lancing College Chapel" (1,108), by Messrs. R. H. Carpenter and B. Ingelow. They are softly coloured, and represent the groining, pure and good of its kind, though rather cryptlike in the drawings. Mr. Ernest Lee's "Cottages at Midhurst" are unpretending, but meritorious; while Mr. S. J. Nicholl's "Chapel in Catholic Cemetery, Clitheroe" (1,118), is an exceedingly clever treatment for a building that usually aspires too much, if it does not occasionally minnie a parish church. The timber treatment of the spandrels of open porch, which extends along its front, and the simple flèche and hipped end of roof strike us as very appropriate. In this connection we may refer to Mr. J. Martin Brook's "Design for Lych Gate" (1,123), a rather weakly-looking drawing in brown, but showing a moderate and carefully treated design in Gothic. Mr. Henry Walker exhibits one or two noteworthy buildings. No. 1,127 is a line drawing of an Early English interior—"Design for Potternewton Church, Leeds," and the only fault we have to find with it is the rather massively and over-membered chancel arch. His other and more important exhibit is (1,146) a large and vigorous, but inky, perspective of Arncliffe Church, Leeds, showing the fine gabled end pierced with two tiers of lancets, exceedingly pure in detail, and excellent in proportion. A partial view of the tower is obtained, but the strength of the design is clearly in the west-end. Mr. Brooks sends in one of his charmingly massive interiors (1,129), simple and pure, but not equal to other works we have seen of his. It is the chancel of the Church of St. Modoc, Scotland. Mr. Geo. Aitchison in 1,128 shows a study in colour; we may call it after the Whistlerian manner, a "Harmony in Black and Grey." We certainly can admire the harmony of colour in the gradation of grey or bluish-green tints, though we think the design too blue and low in scale to please most people. The dado and doors are black, and the wall-papers above pass into light green shades. The work is certainly chaste, and shows refinement. Messrs. Goldie and Child exhibit the interior of a Dominican church, Waterford (1,134). It is an ably-coloured interior of a

Basilican-looking church; the arcades, with their round arches, rest on marble columns, and are good Romanesque; the panelled treatment above arches, and the flat, open-timbered roof, produce a rich effect, though we may question the decorative scheme of colouring. One of the most successful churches is Messrs. Dunn and Hanson's St. Catherine Church, Birmingham (1,147), illustrated by us some time ago. The west end, with its five-light window under an obtuse arch, the treatment of the spire springing from an octagon with pinnacles at the angles, are admirable features, and there is a quiet dignity and repose that is pleasing. The coloured drawing is excellent. Another very fine coloured interior for the Church of the Oratory, Brompton, by Mr. A. J. Adams, must not be passed over. This design has some admirable points, such as the pierced piers, which carry the main ribs of vault, and the screens between them, below, separating the aisle from nave, and the subordination of the latter to the main order employed. But the design is made to appear at its best by the excellent drawing and delicate colouring. The fresco subjects in the ceiling are introduced with remarkable taste and feeling, though we must take exception to the rather large and naturalesque treatment of the figures. Another ecclesiastical work of importance is No. 1,166, a view of the Church of Our Lady and St. Denis at St. Mary Church and St. Mary's Priory, by Messrs. J. A. Hansom and Son. There is a queer want of symmetry in the tower, the angle turret of which destroys all balance, and one belfry window is squeezed in very uncomfortably. The Gothic is of a florid type, and open to the charge of being a little piecemeal in effect. Mr. Brangwyn sends a view of his competitive design for the Yarmouth Town Hall (1,161), a very effectively grouped building in brick, Flemish in feeling and detail, and with a very massive and pleasing tower termination. Close to it we notice Messrs. J. G. Craze and Son exhibit a portion of ceiling decoration at Longleat, in a rather florid style of Louis XV. The colouring is very rich, but heavy. Near it we find another study in an extremely opposite style, Pompeian in character, by Mr. G. E. Fox, in which the questionable feature of pictures is introduced in the panels. No. 1,156 is a frittered and rather confused design for a chimney nook; No. 1,155, design for end of hall, is a far more successful attempt at decoration by Mr. Christopher Gill. A conspicuous place is given to W. Vernon's Buildings, Hastings (1,169), the only remark we can pass being that the drawing is better than the design, which is conceived in a heavy kind of muscular Gothic; while Founders' Hall, St. Swithin's Lane (1,183), is a design in Classic dress of too unmitigated meagreness to enlist the attention of those who have an eye to the picturesque.

* * In noticing Mr. Street's drawing of St. Peter's Church, Bournemouth, last week, by some error, for which we cannot account, we described it as one of its author's "smaller brick churches." The building is really a stone one, and of considerable size, as our readers will see when the illustration appears in our pages.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meetings of the Association were resumed on Friday evening, the President, Mr. H. L. Florence, in the chair. The earlier part of the meeting was made special to consider the proposed alteration of the rules with reference to the nomination of, balloting for, and election of candidates for membership. Mr. Hayes, senior-hon. sec., read the proceedings and reports of the sub-committee which has considered the question. The amendments of rules recommended by the committee were agreed to without a dissentient voice being raised. They

are in Rule 10, in which it has been decided to insert after "proposal of two members," the words "and also of rejecting any proposal"; to omit the words "every nomination shall be made at a general meeting," and to substitute for them "the nomination shall be made at the first general meeting in each month;" to omit the last two words in the Rule, and to add "in any particular case, if demanded at a general meeting, or by letter addressed to the hon. secretaries. In this case the election to be postponed for at least a fortnight, and notice to be given at a general meeting and sent to the proposer and seconder by the hon. secretaries at least a week before the election." A new form for the nomination of candidates was also laid before the meeting, and adopted unanimously. The ordinary business was then proceeded with. Messrs. John S. Nanson and Alexander Whitelaw were elected as members. On the motion of Mr. Hayes a vote of thanks was passed to Mr. Penrose for accompanying the members in their visit of the previous Saturday to St. Paul's Cathedral. The next visit will take place on Saturday, the 17th inst. (to-morrow), to the new Holborn Infirmary opposite the Archway Tavern at Highgate. The President announced that the water-colour class would soon be recommenced under the guidance of Mr. Sutton Palmer, and names of intending members must be sent in before the 19th inst. At the recent *soirée* the drawings executed by the class during the winter were hung on the walls of the room, and he was surprised and pleased to note the great progress made during this session. The surveying class would also recommence on Saturday. Mr. Hayes announced that on that day fortnight the nomination of officers for the ensuing year would take place. At a later period of the meeting the President mentioned that the Royal Architectural Museum Sketching Club had arranged for a series of out-of-door meetings for the summer months to sketch well-known buildings, to which the subscription would be 5s. annually. The first excursion would be held on the 7th June at Stone Church, Kent, and would be conducted by Mr. M. B. Adams; Mr. Randall Druce was the secretary.

THE MEASURING OF ANCIENT BUILDINGS, WITH SPECIAL REFERENCE TO ST. ALBAN'S ABBEY.

MR. JAMES NEALE, F.S.A., then read the following paper, prefacing it by explaining that he considered the easiest way of suggesting how a building ought to be measured would be to describe the actual instance of St. Alban's Abbey, rather erring on the side of minuteness and precision than giving too general an account. The lecture was illustrated by a series of over eighty plans, sections, and detailed drawings, and photo-lithographs from Mr. Neale's recently published book, of great size, and evidencing great accuracy and skill in execution. The first thing that was wanted in measuring the great Abbey of St. Alban, he said, was a long line carried through the doorways of the great screens. A telescope was used in ranging this line from end to end. The intermediate points and the ends were fixed with much accuracy. As it was impossible in paved floors to fasten up uprights, lumps of clay, forming a kind of candlestick, in which thin laths were fixed, were used at intervals on the paving. Then two other lines exactly parallel to the first line were run from end to end of the aisles. Cords were stretched along portions of the first line: lines were squared off at the ends, and the new lines were ranged. At distances of about 50ft. small crosses were cut in the pavement, so that any part could be (and can be) easily referred to. The next task was to obtain similarly marked lines, running from north to south. Strong whipcord was strained along the first line, and a square about 16ft. long in the arm was used. Seven lines were obtained, working from the west end; these were: No. 1, outside the western front; No. 2, inside the church at the west end; No. 3, on the west side of the rood screen; No. 4, through the transept and tower; No. 5, through the openings of the westernmost bays of the sanctuary next to the tower; No. 6, on the east side of the great altar screen; No. 7, through the public passage which then existed through the ante-chapel, but since closed up. These lines were also permanently marked. These main lines were again very carefully measured later on, so that the extreme dimensions could be given in a tabulated list. For the plan, lengths of the main lines were put down with whipcord, secured to nails in joints, and pieces of the building

were measured systematically and plotted as soon as possible. A large board was covered with paper for the 4th scale plotting, which came out about 6ft. by 2ft. 3in., and the main lines being laid down, the plotted portions were attached in position. A little board could thus be used in any part of the church, and the little plans all put together made up the large plan. Short lines were strained near the wall through-out, so that lengths and offsets could be taken accurately with rods without the use of the square. In consequence of the distance of the return faces of the line it became necessary to use a square—the large one previously mentioned—and another one about 6ft. long in the arm was also kept at hand, so that they might be changed the one for the other as occasion required. When some considerable portion of the plan from the interior was ready to be put together, I thought it desirable to set up testing lines on the exterior, although I did not measure the whole of the exterior at that time. A line was put down from east to west, and certain lines from north to south were carried through openings to join the external base line. The lines and dimensions of the great cloister and stype were fixed by means of these lines and diagonals were run on to them, so as to fix the external wall faces of the aisles, transepts, &c. Diagonal dimensions were taken in considerable numbers, both inside and out, so as to assist in the detection of errors. We have hitherto dealt only with the plan; for the section and elevation, it was of course necessary to fix a datum level before beginning anything. This level was fixed at about 4ft. above the level of the east end of the sanctuary, because it allowed the level to be placed upon the floors there, and did not rise above the heads of the doors in the screens. At a number of points this datum was marked on the walls in a distinctive way, and a long mason's level was used to carry the datum to other positions. Five bays in the church were selected for complete analysis—the Norman bays in the nave and transepts, the Early English bays in the nave and sanctuary, and the Decorated bays in nave. For these detailed measurements, special scaffolds were necessary. The landings of the scaffolds were placed at three levels—the clerestory passage level, the triforium passage level, and the top of the capitals of the ground-story arcades. Small scaffolds erected in these landings were necessary for measuring capitals, arches, and other mouldings; ladders gave access to all the other portions. The centre lines of the piers and bays were carried up by means of a plumb-line, and marked at each string-course. All vertical dimensions were taken on the nearest of the vertical lines. The mouldings were measured in various ways. As parts of the buildings were under restoration, I sometimes succeeded in tracing the profiles from the stones themselves; generally, however, the mouldings were measured by means of the straight-edge and square. When the mouldings had been plotted full size, the profiles could be filled in on the general drawings and details. The jointing of the masonry was measured last of all, when the drawings were otherwise complete; slips of tracings were taken off and laid on the small boards carried up to the scaffold, and the joints laid down directly in front of the work itself. The board on which a detail drawing was fixed was hung easel-fashion to the rungs of the ladder by strong clips, so that it could be readily shifted. The small boy, an indispensable and economical assistant, would hold the rule and call out the distances of joints in the masonry, and these could be rapidly plotted with the aid of a small scale and dividers on the board while standing on the ladder. For mouldings, a common pair of dividers was used, the legs being bent inwards so as to span a curve of any form, and cross sections were taken with the aid of these and a rule. For the dimensions, Chesterman's ribbon steel tape 100ft. was used. All the long dimensions were taken twice. It is excellent for the purpose, as it was found not to vary on being tried at intervals by the standard in Trafalgar-square; but it has this disadvantage, that if the unavoidable boy treads on it it snaps. For copying the painted glass, Whatman's drawing-paper was cut to the shape of the tracery, and the main outlines were traced from the glass. The drawing was then completed on the spot. The painted decorations were also traced; for those on the vault of the sanctuary, some 63ft. from the ground, it was necessary to lie down on one's

back on the scaffold, being blocked up as close as possible to the vault. The tracings were made on very transparent French paper, fastened to the boarding with drawing pins. The actual process of measuring having been described the preparation of the drawings ought not to be passed over. The scale of the plan 8ft. to the inch, was followed for the elevations and sections. The detailed bays and the tower were drawn to a scale of 2ft. to an inch, the porches, slype, windows, arcades, &c., to a scale of 1in. to 1ft., and all the mouldings were taken real size. The student will gain immense assistance by associating with and being civil to all the workmen employed on a building. They will then point out various features and give valuable information. Then again, a little beer on a hot-day improves matters and after this, ladders, &c., which were nowhere about immediately turn up. If ever, by the way, I were to undertake such a work again—which I shall not do—I should purchase two or three ladders and sell them when the work was finished. A closing ladder of about 10ft. high is valuable, and easily carried from place to place. Above all things, I know of none I should like to impress upon those students who measure old work more than truthfulness—truthfulness and accuracy in every line and every moulding drawn; no trouble should be spared with even a minor detail; in fact, nothing should be given up with the feeling "Oh, it will do." Every drawing should be laid to scale on the spot. This appears to require time, but will in the end be found the quickest and only reliable manner to obtain accuracy. The system of running from church to church, measuring this arcade and that doorway, and laying the same to scale at a future time, is really the chief cause of the errors we so constantly find. There is no architect, however clever he may think himself, but as soon as he gets home finds one of the chief measurements missing. It is only a short time since I collected eight drawings of a favourite arcade at St. Alban's, made by as many different students, and not one of these was perfectly correct, nor did any two agree one with the other. We are open to criticism from quarters where we least expect it. For instance, some months ago a gentleman finding the scaffolding up in the nave of St. Alban's, had the curiosity to count the number of dog-teeth shown by me in the triforium string; the visit was satisfactory, for he counted 164, the same as in my drawing; but it was inevitable, seeing that they were plotted in on the scaffolding. The young architect should only enter upon the work of publication after serious consideration. He will find numbers of friends advising him to publish. He will even find lithographers temptingly instancing various gentlemen who have undertaken such work, and thereby accumulated little fortunes. All this advice must be taken with caution, and it would be advisable for the intending publisher to consult an architect who has published, and hear his experiences. The quality of line, the openness of the drawing, the amount of reduction, the use of dull ink, of elastic or non-elastic margins, are a few of the things which will force themselves on the attention of the draughtsman, and must be dealt with rightly, and a host of others as well—such as blacked profiles of mouldings, ruled profiles on original drawings, machine-ruled on the first proof of the photo-lithograph, the heraldic methods of indicating colour, and the fearful labour and anxiety of coloured plates—are all pitfalls, obstacles, annoyances, calls for vigilance and good temper, which will fall to the lot of the unfortunate architect who wishes the world to profit by his strenuous labours. I may mention that Mr. Featherstone's new patent ink will be found most valuable for architectural drawing; it has the advantages of being able to be kept in a bottle for years, already mixed, without thickening, it works beautifully for pen-and-ink drawings, and loses the glossy appearance which is detrimental to all drawings intended for photo-lithography. After measuring a large building like St. Alban's, which happens to afford good specimens of work from the Norman onwards, one is supplied with all the materials for comparisons between work of the same scale in the same materials in different periods. Let us, for instance, consider for the moment the subject of proportion. The difference of expression in the various periods is very considerable, although the total height and the spacing differ but little. In a Norman bay of the nave, the pier of the ground story or triforium is as wide as the arch carried by it.

The width of the glass of the clerestory window is only one-fifth of the distance from centre to centre of the bay. In each bay, reckoned from centre to centre of pier, the area of the openings is between one-third and one-fourth of the total area of wall, or, more precisely, .293 of the total area. In the Early English bays on the north side of the nave the great piers of the ground story are less than half as wide as the arches between them. The width of the glass of the two clerestory windows is between one-fourth and one-third of the distance from centre to centre of bay. These windows supply nearly double (Norman 30ft., Early English 54ft.) the amount of lighting found in the bays of the Norman buildings. The Norman windows are the widest, but the Early English ones are higher, and there are two in each bay, instead of only one. In each bay the amount of actual piercing through the wall area is between one-half and one-third (more precisely, .421) of the total wall area, reckoning from floor to plate of roof, and considering the triforium arcades in the light of actual piercing of the wall surface. If these proportions are borne in mind the strong contrast between the work of the 11th and the first half of the 13th century, an interval of from a century to 150 years, will be seen. The architecture has been lightened in every sense. The relation between solid and void has undergone so considerable a change that in place of the somewhat unwieldy dignity of the earlier days, we have graceful, vigorous manhood, full of life and spirit, and with a sufficient dignity of its own. In the Decorated period the proportions are not so widely different from those prevailing in the previous century. If a spectator could abandon for a few moments the habit of questioning about details and would stand in front of the Early English and then before the Decorated bays in the nave of St. Alban's he would find their general expression so similar that he might fancy he was looking at two parts of the same work; the spacing of the bays, dimensions of all piers, sizes of openings, and scale of details are all similar. It is but bare justice to interpose here a mention of the influence of the Norman church on all the work that supplanted it. The height that the Normans gave to their walls, the widths of their bays, the sill levels of their clerestory windows, the impost levels of their ground story arcade are re-echoed in the work of the 13th, and with slight modifications (all improvements be it noted) in the work of the 14th century. The reason why the proportions in the sanctuary differ so widely from those in the nave is an interesting bit of history and the thoughts, doubts, and conclusions of the 13th century builders. The very capable artists who dealt with the sanctuary did not destroy, but completely altered the work they found in existence. They kept it, evidently with great regret, merely because its removal would have imperilled the safety of the central tower. The Perpendicular period is not represented in the structure to the same extent as the three earlier periods. It cannot lay claim either to the very rare excellence and completeness of some of the works of other dates. The abbots commanded skill equal to the best of the time in England, but they directed their efforts merely to the alteration and enrichment of the structure; they were not urged by ambition to destroy and to rebuild, nor to make additions, as their predecessors had done. Thus we find changes constantly going on: massive dignity at the first, then more and more lightening of the masses, grace gained, and wall space parted with. Let us now institute a few comparisons, such as the form of arches. In the original Norman church, consecrated in 1115, all the arches are semicircular. There are in the slype semicircular arches worked to interlace, of the Late Norman period, 1160. Such interlacing arches have received credit for suggesting the form of the pointed arch, but they are not justly entitled to it. The real motive for the use of the pointed arch was a constructive one; in the Early English work at St. Alban's the arches are without exception pointed. The advent of this style was marked, as a general rule, in English by the use of an acutely pointed or "lancet" arch, and, as the style advanced, the extreme pointedness gave way to arches struck with shorter radii. St. Alban's, however, furnishes many exceptions; for instance, the arches in the western porches and in the western bays of the nave are not nearly so acute as some

arches in the eastern part of the church which are more than half a century later. In Perpendicular work the four-centred arch is used, but three-centred and elliptical forms also occur. Again, as to mouldings. Those of the Norman period are almost non-existent in the original structure. Such stone as was used was shaped with the axe, and the varied and delicate forms of later times would not have harmonised with the broad wall-spaces of the Norman builders. When the chisel came into use, moulding, previously out of the question, became possible. In Late Norman work some five forms may be found, but 50 years later 33 independent forms may be distinguished in the Early English bays of the nave. The history of the character of mouldings, in a dozen words, is—1, no undercutting, and then a little; 2, much undercutting; 3, less undercutting; and 4, little or no undercutting. Even to the latest Gothic works, the mouldings are not composed of regular curves, but are drawn by free-hand. By this means is avoided the effect of mechanical harshness, which is one of the crying sins of modern work—professedly following almost slavishly the work of our early masters.

Mr. S. F. CLARKSON moved a vote of thanks to the lecturer for his interesting account of his long labours at St. Alban's. He should have liked to have heard more about the way in which external dimensions were taken, and especially as to the mode in which the internal and external measurements were checked and combined. His peroration had shown very careful study of the different stages of architecture, their qualities and proportions; but he had seemed to attribute to the Norman building too vast an influence over the later structure. To himself it seemed to require considerable use of the imagination to see that the Norman was carried through the Early English bays.

Mr. ASTON WEBB, in seconding the vote of thanks, asked for particulars of the new ink mentioned by Mr. Neale as more suitable for reproduction by photo-lithography, and why it was that the reproductions hung on the walls by the side of the original drawings looked so much darker in line, and if one could sufficiently judge beforehand what would be the effect of a reproduction? Mr. Neale seemed to have given up shading his drawings after a time. Why was this?

The PRESIDENT said the point was forcibly brought home to the mind by Mr. Neale's paper, that before measuring a building it was desirable to sit down and study the best mode of accomplishing the task. The great care the author had taken in commencing his scheme to decide this was remarkable, as well as the courage, order, and skill with which he had carried it out, and the members were indebted to him for re-collecting and recapitulating all the little details which made the paper really valuable.

Mr. NEALE acknowledged the vote of thanks, and briefly replied to the questions which had been put to him. The proportions of the later work at St. Alban's was undoubtedly influenced to a great extent by the Norman building—the height and width of bays were fixed proportions—but builders of each generation regardlessly cut away any of the older work to make for a tomb or fancied improvement. His external levels were taken with the theodolite and frequently checked and compared with the internal measurements by passing lines through the windows. The levels beyond the transepts required an enormous amount of time and labour, and as the President had intimated, the only way by which measuring an edifice could be accomplished was by arranging the general plan of work and its details before going into the building. Of course, as Mr. Aston Webb had said, the total length of the building and other dimensions were about to be altered, but with the present scheme he had nothing to do. The beautiful west porch was to be pulled down to be replaced by better because 19th-Century work, but whether this was to be an imitation of that of the 13th Century, or of the time of Queen Anne, he had not inquired. The ink he had referred to was invented by Mr. Featherstone, of Chertsey. No blue-black ink was suitable for photo-lithography, because all blue tints were simply white in photography. If an ink erred from jet black it should be towards a brown tint. He made at first the mistake of using different coloured inks in the same drawing, but for reproduction by this process the only mode in which tone could be gained was by thickness of line. All lines came out thicker

than drawn. When he commenced work at St. Alban's, Mr. Street looked over the drawings and advised that they should be left unshaded, while the late Mr. Sharpe wished him to hatch them all over, a process which in some of the large drawings would be a work occupying several weeks without adequate results. He found that practically the best plan was to add shading on the stone, by means of a scored roller, which left an impression on all the parts of the stone which had been touched with gum. He should be glad to give further hints on measuring to any one who would call upon him at his office.

THE HISTORY AND AESTHETICS OF ARCHITECTURE.—III.

IN his third lecture, delivered at the Royal Institution on Saturday afternoon last, Mr. Statham dealt with Romanesque architecture. Properly speaking, he said, it was not a "style," but was a process by which the mode of building practised by the Romans was gradually altered by the infusion of Teutonic ideas and influence, and so prepared the way for the development of Gothic architecture. He should devote one afternoon of his course to Romanesque, as one could not properly understand Gothic without following out some of the traces of the course by which it grew out of Roman work. In his lecture last week he had purposely omitted reference to one class of Roman building because its interest was almost entirely confined in its relation to Mediaeval ecclesiastical buildings—the basilica. This was originally a combination of corn exchange and police-court. Illustrations were shown of a restoration in half-section and plan of the basilica of Trajan, from the description of Vitruvius. It consisted of a central area of one floor, and on either side buildings of two stories open to the central portion, and at one end was a high sanctuary and a semicircular recess for the judges' seats. In the basilica which formerly occupied the site of St. Peter's at Rome, the second story had been abolished, and there was a hall with double lean-to aisles, and with a central wall dividing the nave from the spacious narthex and atrium. On the inner faces of the walls, where the roofs rested upon them, the necessarily blank space was ornamented with false windows and bands of ornament; these were the precursors of the very beautiful triforia employed in Mediaeval churches for the same purpose of decorating wall space which could not be pierced or done away with. There were in the later basilicas of Rome indications of a small projecting transept or chamber thrown out to allow of more easy passage to and fro, and adjoining the apse was on either side a passage leading to a circular building. The latter was the link between the round tombs of the Etruscans and the chapter-houses attached to Gothic cathedrals. In many of the later basilicas, especially after they were used for Christian worship, the walls were supported by rows of columns stolen from various temples and other ancient edifices, and introduced with little reference to their suitability the one to the other. A new form of building was seen in the Basilica of Maxentius, built in the days of Constantine, and here the roof was for the first time a series of vaults and sections of domes. The lecturer proceeded to explain in detail what a Gothic vault was, and how it assumed its outlines. The original form of vault was the barrel, but it was found very uneconomical when used on a large scale; the side walls needed to be very thick and massive to withstand the outward thrust, and unless very large stones were used for the crown the component parts did not form wedges but almost unsupported lintels, and hence there was great danger of displacement and sliding. By putting two barrel vaults at right angles across one another, as in the quadripartite vault, the form was strengthened and the points of support were reduced to four. The constructional difficulties were increased where vaults of different span abutted upon each other, as they only could be met with the use of a round arch by the expedient of stilted the smaller arch, or by making a series of small arches cutting into the sides of the principal vault, both of which devices had an unsightly effect in the twisting of the lines of junction. All these and other difficulties were overcome by the use of the pointed arch—a form which was introduced from no ideas of taste or beauty, and certainly not in imitation of an avenue of trees, as popularly supposed, but solely for prac-

tical reasons. It was noticed that a wall need only be thickened where the outward strain of the arch tended to push it over, and the thickening took the form of a pier, and then as the action of strains was investigated that of the Gothic buttress. Having thus explained the development of Gothic features, the lecturer retraced his steps, in order to consider some of the typical forms which Romanesque building took. An early example was the Basilica of San Vitale, at Ravenna, which might be described as a Roman building, with a certain amount of Byzantine detail. It was built after the removal of the seat of empire from Italy to the East, probably during the reign of Justinian or a little later. In plan there was a strong similarity to the central part of the Temple of Minerva Medica at Rome, and to some of the baths, but the capitals of the columns had triangular faces, covered with Byzantine ornament, and were apparently derived from a combination of the coupled columns frequently used for supporting Roman arches. A somewhat similar, but later and rather more clumsily constructed, building, was the Baptistery of Sta. Agnese. These Romanesque buildings seemed analogous to our building churches in colonies with local material, and after the local manner, but sending the stained glass and the decorations from London: and the theory appeared to be confirmed by their character. Another and much more recent class of Romanesque buildings might be grouped together, as showing how this style of building gradually spread over Europe. In these, which were built in the 11th century, there was a central low dome, with other smaller ones grouped around a central hall, and connected with each other by domical vaulting. Foremost amongst these was St. Sophia, Constantinople, the extraordinary and romantic church of St. Mark at Venice, and the central church in the Anjoumois, St. Front at Perigueux. Between Venice, Angoulême, and the East there was a great commercial traffic and constant intercourse, which accounted for the general resemblance between the buildings of countries so widely separated. At St. Front, as, indeed, in very many other of these Transitional buildings, the arches supporting the domical vaulting were pointed, while those used in arcading and for other decorative purposes were round, showing that the pointed form was simply adopted because safer for constructional purposes. The cathedral at Trèves afforded one of the best illustrations of what Romanesque architecture became in the North. The numerous small massive towers ending in conical caps, and the pilasters disposed over the outer faces of the building, were quite characteristic of the style. These pilasters afforded an excuse for thickening a wall where needed, buttresses not having come into use, and the caps were treated after the Classic manner with projecting volutes, but the foliage was changed and made more varied. In the North of Italy the style lasted much longer than elsewhere; the pilaster became still more exaggerated, and took the form, as at San Zenone, Verona, of a series of piers breaking up each face of a building. The style was in Italy treated in a more Classic spirit, and was practised there at the same time that Norman cathedrals were rising in Durham and elsewhere in England. At Valence might be seen a further development of the style and one more nearly approaching Gothic. In this church tall piers supported the arcading, which was still of circular arches, and to the piers were attached columns, which last supported a circular rib carried directly across the vault. The columns had, however, Classic capitals and bases. In the later examples of Romanesque in Northern climates the diagonal arches of the vaulting were frequently bounded by a mere line, but the junction of those which crossed vertically was covered by a flat band of masonry. Of the incipient buttress a late example was shown from Kirkstall, in which it was composed of two pilasters set diagonally, and finished with a square pier or cap. From the same abbey was illustrated the use of the pointed arch for the arcade where strength was needed, and of the round arch for the merely decorative clerestory lights alone. In conclusion, the lecturer explained, by a series of drawings and by black-board illustrations, the gradual development of the Late Norman capital, with its many members and vigorous carvings, from the triangular-headed, foliage-carved capital, adapted by the Romanesque builders from Byzantine models,

and showed how the use of smaller stories, and the improved mode of working, gradually led to the adoption of a lighter and more decorated style.

THE "BUILDING NEWS" DESIGNING CLUB.

A VILLAGE SCHOOL-CHAPEL.

WE have received several designs for this subject, though the requirements have been rather freely interpreted, some of the members having sent in sketches for small churches, while others have lost sight of the character that a mixed building of the kind should possess. "S in circle" again takes the lead. He makes his school and chancel one simple parallelogram, with a class-room projecting on one side, and a small vestry on the other, the lobbies for boys and girls being combined at the end with lavatory arrangement. The conditions required accommodation for 60 children, and the author makes his schoolroom 34ft. by 18ft., with three groups of desks ranged along and lighted on the north side; the chancel is a continuation 13ft. deep, and is provided with a sliding screen which is made to run into a hollow in the vestry wall. The lobbies are conveniently grouped at the west-end and form a double timber-framed porch. The elevations exhibit a Late Gothic treatment, the east-end having a touch of French Flamboyant in its composition, and the class-room making a transept. It is simple in grouping and effective in the detail. "Honey Dew" is a cruciform arrangement, the class-room on one side being made to balance a vestry, organ chamber and porch on the other, with a chancel and sacristy. The fault is that a too church-like plan has been followed, the nave having a central passage and a row of seats on each side. It is not necessary to seat the main building as a nave with permanent seats, as the arrangement shown would not adapt itself for teaching purposes; nor is a pulpit or desk required, nor the choir-like arrangement adopted, as these accessories might be easily improvised when required. The design is unpretending though dignified, in a Late Gothic style, with small tiled turret over east end of nave; the drawing is neatly and carefully executed. "Be to its merits very kind, &c." hits the mark much nearer in plan. The whole building is contained within a rectangle with a chancel apse and vestry at one end, and a porch and cloak-room forming a small projection in the centre of one side. The chapel and school is 29ft. 6in. by 20ft., and accommodates 42 children; it has two groups of desks for seven in each row; at the end of chapel is a class-room of the same width, and 12ft. deep, with two groups of seats to accommodate 24 children. The screen to chancel runs on an iron rail into thickness of wall, the details of which are well shown. We think the plan would have been better if the class-room had been separated by a screen or curtain, so that the whole room could be used on certain occasions. The seats are proposed to be movable, and the author has well studied his details; the external design is suitable, with square-shaped mullioned windows, &c., plain bell gable at one end. The materials are coarse rubble for walls and Bath dressings with red tile roof. The elevations are rather coarse in the hatching. "Jack" sends a clever sketch and plan in a somewhat broken Domesticated style of red brick, the upper part of walls having timber work with concrete filling-in. The school is well lighted by side and gable windows, and is 30ft. by 18ft., entered by two porches at one end; a lobby with lavatories being combined. There is a transept which makes a class-room, a chancel with circular end for altar, a vestry and entrance with recess for harmonium. Sliding doors running into the side chancel wall divide the latter from the school; a prayer-desk and lectern with choir seats are shown in chancel, but no groups to the schoolroom. A quaint belfry, with ventilating louvres, semi-circular on plan, projects over one porch, capped by a conical roof; but the style is certainly a little too grotesque, despite a very good plan. The author estimates his design at £590. "Omega" fails in the planning of his entrance and class-room, which form a small low transept at the end. There is but one entrance to the school-room. The chancel has a rather flat oven-like form, and is not deep enough. Externally the design is better and the style chosen appropriate. The

author proposes to have timbered gables, and a bell-turret at west-end of roof. "Triangle in circle." This is a plain and very suitable treatment externally, but spoilt by an imperfect plan. The class-room does not communicate directly with the schoolroom, and the chancel is rather shallow, though it is spanned by the same roof as the main building, which is a good point in a small structure of this kind. A folding screen is shown between the two. The vestry is an awkward room. The author has conceived his design in a quiet yet dignified manner. "Try" shows a marked improvement in this design, and if he had not such a long and narrow schoolroom, better entrances (there is only one shown), with the omission of the baptistry recess, and a little simpler turret to break the main roof, his design would have stood even better than it does. The plan is based on the right principle of having one main roof and ridge line, but there is no vestry entrance, and the class-room is too small to be of much service. A movable screen is shown. We like the south elevation, and the details are suitable though monumental. The chief fault with "Maggie, alias Sueh a Dog," is the very confused and awkward arrangement of the porch, cloak-rooms and offices, which are made to occupy a large part of the main building instead of projecting. The class-room would have been better in their place. The chancel and vestry are separately roofed. Red brick in a Late Gothic style is proposed, but the centre chimney cropping out in the roof destroys the effect. This should have been placed on one side. "Nitor" is the motto of a design of too monumental an expression. The class-room and lobby are in good relative positions, but the plan is not worked out with sufficient skill, and no seats are shown. Far too church-like is "Impavidum Ferient Ruinae." There is nothing except the class-room to indicate its real purpose; the pointed headed windows and doorways and the deep buttresses are also out of place, and the lobby entrances not so well planned as they might be. The drawing is neat. "Truth shall Prevail," errs on the same side. We cannot see any advantage in the entrance passage on each side of the class-room, nor the lavatory arrangement which forms an extended narthex at the west end. The material is red brick, treated in an ecclesiastical manner, but with detail of a rather coarse and commonplace kind. Drawings are neatly executed. "Noah" sends a pleasing little structure designed in a 17th-century style, proposed to be built of flint and red brick with half-timbered east gable and bell-turret at the west end; the class-room is placed at one end and the chancel at the other, separated by folding doors, so that both may be thrown into one when required—a desirable point. The chancel is surely too low externally. Another design without motto (we believe "Curiose") shows a square-shaped building 24ft. each way, with a hipped roof fitted up as a chapel with three rows of seats. The class-room is at one end and the chancel at the other; but we do not know the use of the scullery with a copper in it unless for tea-meetings. "Con amore" places his chapel at the end of a large class-room 30ft. long, the two being at right angles; lavatory and porch are obtained together in the angle thus formed. The evident result of this arrangement is cost. Why a separate chapel? External treatment is better. The fault committed by "Not wisely but too well" is that of many others—losing sight of the school in the chapel. The class-room is a mere cupboard, and the best part of design is the bell gable. "Melmotte" is too chapel-like, and the class-room is not made the best of. We recommend the author not to try perspective till he quite understands it, and never to draw a canted angle perspective in an elevation, as he has done in the chancel in both elevations where the horizontal lines are shown to vanish. The class and cloak-room in "C. W. D.'s" plan, together with the entrances at both ends, are awkward, and the design lacks study and refinement in detail. "Boz" places his class-room too far from the chapel, and the idea of a school seems to be subordinated to that of a chapel; yet there is something appropriate in the exterior design. "East Anglian" exhibits a suitable treatment; the class-room and vestry and the groups of desk are well placed; the chancel is under the same roof, and a sensible bell-turret surmounts the ridge at the separation, but the entrances are not well-planned. "Steffano" is a rather

expensive plan in the entrances and lavatories, and exhibits a want of skill in combination. Elevations are simple but too commonplace. "Melina" sends a rather more monumental-looking building, Norman in style; but the long wing of cloak-rooms and closet, and the out-of-the-way position of class-room, are objectionable. Why the separating curtain between boys and girls in the chapel? which last is uppermost, if we judge from the seats and fittings. We can only mention "Elève" as a better plan than the last, but expensive in design with a short apse over porch; "Ogmore," too chapel-like in arrangement; "Revus" and "Belteshazzar" both fail in the same way. We may generally sum up the chief defects in the designs as the following: the ecclesiastical arrangements too much, and separately roofing the chancel. Those who have grasped the idea have rather directed attention to the school as the principal element, providing at the same time a spacious chancel and easy means of throwing the class-rooms into the chapel when services were held.

A HALL CHIMNEY CORNER.

WE have not received so many good designs for this subject as we expected. "Noah" sends one of the best and we place it first because it conforms to a current fashion in taste. It is a very pleasing arrangement for a hall recess, opening into the hall by an archway or frontispiece of panelled oak. There is a dog-grate. The details are not fussy, and the seat backs in the recesses are covered with gilt embossed leather. "Ad Valorem" is also a meritorious design in a Gothic treatment. The recess is arched by a deeply-moulded arch, and a series of panels with trefoiled heads relieve the mantelpiece over the fireplace, intended for tile figure subjects. Above this a canopied niche for a timepiece. The details are good. "Curiose" also sends in a Gothic sketch tolerably correct in detail, the fireplace in this instance being placed angle-wise across a canted corner of the hall. The chimney-piece is massively treated, but is spoilt by the final clock-bracket and clock. "Be to its merits, &c.," shows a shallow-arched recess or canted bay with narrow lights in the canted sides. The chimney-piece is plain and has a curvilinear shaped hood of stone. The details are of Perpendicular character. A series of panels in wainscot relieves the space over the arch or recess and the whole is intended to be oak except the mantel and hood. "Yesor No" is a bold sketch in a rather modern Gothic, but the heavy corbels supporting projecting work above the recess, and the ball-flowers to the hollow of it are decidedly *outré*. "Try" sends a clever design in a kind of German or Flemish Gothic. We prefer the recessed treatment, in which some good detail appears, particularly in the chimney piece. It looks like a reproduction or an adaptation of something we have seen before. "Ogmore" does not show plan, and we can hardly make the drawings out. Details are, however, wanting in character and simplicity.

THE WESTMINSTER INDUSTRIAL EXHIBITION.

THE building that has been erected in Victoria-street, Westminster, for the Westminster Industrial Exhibition, to be opened on the 24th instant under the presidency of Prince Leopold, by the Right Honourable the Speaker of the House of Commons, is from the designs of Mr. Seddon, Vice-chairman of the Committee of the Exhibition, and honorary architect.

In the winter holidays of 1877-8 an Industrial Exhibition—by the exertions of the Rev. H. E. Fox, of Christchurch, Westminster, and a committee of working men, and others—was held in the Townsend Schools, lent for the purpose for the space of one week only. The success of that experiment emboldened the committee to try to repeat it on a larger scale, though a proposal which was then made by Mr. Seddon, that a special building should be erected for the purpose on one of the vacant sites in the neighbourhood, was thought Utopian at the time.

In the spring of this year, however, the idea was revived and thought more feasible, and negotiations were entered into with various owners of land in the vicinity, for some time without success. At last, however, a proposal made to the Governors of the Grey Coat Hospital in Westminster, among whom are numbered Canon Farrar and Mr. G. Spottiswoode, met

with a favourable and kindly reception, and a loan of an admirable site in Victoria-street, belonging to the Hospital, was offered until the end of April in this year.

The committee, however, felt that it was impossible to do anything worthy of the object in so short a time, and on their further application the time was extended until the end of June.

This offer the committee resolved to accept, burthened though it was by penalties somewhat awful to contemplate; in case every stick and stone of the erection and its contents were not removed from the site by the day stipulated, the Governors of the Hospital being empowered then and there to enter upon possession and sell everything, and hand the proceeds to the Westminster Hospital.

A public meeting was held in February at the Grosvenor Hall, Piccadilly, to ascertain public feeling with regard to the proposal—the Right Honourable the Speaker in the chair, supported by the Right Hon. W. H. Smith, M.P., Mr. G. Spottiswoode, and Sir Rutherford Alcock, and others. The result of this meeting proving satisfactory, the present committee, with the Rev. H. E. Fox as chairman, undertook the management of the undertaking. Tenders for the building were advertised for, and a spirited offer made by Mr. J. C. Humphreys, of the Borough-road, was unanimously accepted. This was to erect four buildings with timber and corrugated iron, each 70ft. long by 20ft. wide, to remain during the period of the proposed exhibition, for £125, on the condition that, should they be sold within that time, the whole of that sum should be remitted, and the charge should be nothing.

These four buildings were then arranged by Mr. Seddon to be disposed round a space of 70ft. square, and arrangements were entered into with Messrs. Piggott, of 59, Bishopsgate-without, tent-makers, &c., who had sent in another excellent and reasonable proposal as a tender, to cover this interior space with canvas, supported on pillars of timber, arranged in the form of a central nave 30ft. wide and aisles each 20ft. wide, for the sum of about £80. Thus a contract was secured for a building about 110ft. square for a cost of about £200, and possibly only £80, exclusive of what flooring might be determined upon for the central area. Of course, however, large and commodious as such a structure would be for the purpose, much else was requisite. It was the stone, a good sized one, perhaps, of the "stone soup" needed. Fittings, decorations, annexes for refreshments and other purposes have necessarily swelled the total cost to a much larger figure, yet at the same time a moderate one, considering the very large total area that has been covered. On comparison with former undertakings of the kind, the committee have found themselves launched upon a more serious enterprise. The largest number of articles exhibited on any former occasion of the same kind has been about 800. The applications of would-be exhibitors to this exhibition exceed 1,800, so that, considering the eligible locality they had secured, the committee have felt that they were justified in incurring the not inconsiderable risk that they have done. They consider also that they have been most fortunate in meeting with contractors of the liberal and enterprising type of Mr. Humphreys and Messrs. Piggott, who have seen and seized the nature of the opportunity offered to them, and in doing so have furthered the objects of the committee of the Exhibition. Messrs. Verity, of Regent-street, have also undertaken, at almost a nominal cost, sufficient only to cover the labour employed, to light the whole building efficiently and decoratively, with gas, also to lay on water, &c.; and both the gas and water and Queen's insurance companies have dealt liberally with the committee.

Under the circumstances above detailed, the buildings have been erected and completed with such rapidity, under the special sanction of the Metropolitan Board of Works, as temporary buildings only, that they were ready for the reception of exhibits on the date fixed, the 12th instant; and though the Committee have a no slight task before them in the arrangement of the exhibits and adjudication of the prizes, there is fortunately no doubt but that all will be in readiness for the opening on the 24th instant. The two saloons for the refreshment department have, however, yet to be built, and are to be a speciality in their way, being, in fact, two portable billiard rooms, which Mr. Humphreys has undertaken to erect upon the new principle of construction of

wooden and iron buildings, recently patented by Mr. John Taylor, of Birehington, in the Isle of Thanet, and of which Mr. Humphreys has undertaken to become the manufacturer and agent. These being offered for sale, the terms made by Mr. Humphreys with the Committee are of the same character as for the larger buildings, namely, that he is to receive as rent £20 for each, to be remitted altogether if the buildings are sold during the exhibition.

In conclusion, we have but to notice the character of the general decorations, which are not only harmonious but effective. The three parts of the central area have graceful suspended linings to their canvas covering of alternate stripes of crimson and white; and two of the four surrounding buildings have their roofs lined with pale blue, and the other two with pink. The walls will be covered with the exhibits themselves, and the windows with stained glass by other exhibitors, and the tables will be stained and varnished or distempered with colour. A fixed seat has been constructed all round the central area, with exception of part raised at one end as a platform, and steps in the centre of the other sides to descend to the lower level of the central area. 1,500 or 2,000 spectators can thus be accommodated sitting or standing behind and around the central area, in case of opening or closing ceremonies, concerts, or other performances, which will be arranged continuously during the Exhibition by a special committee appointed for the purpose.

A PRIVATE THEATRE AT CHELSEA.

A PRIVATE theatre in a country mansion is unquestionably an advantage where the tastes of the owners lend themselves to such entertainments, and not a few notable residences in England contain more or less complete arrangements of the kind. In some cases the theatre forms the great feature of the house, all the other apartments being made to centre round or lead out of it, with a view to the whole forming one grand suite. This plan is open to some serious objections, among which, of course, are those also common to any contrivance for the housing of a theatre, however small, within the walls of an English gentleman's home. The private theatre now building at Chelsea for Sir Percy F. Shelley, is open to none of these objections, as it is situated in Tite-street, at the rear of the back premises of his mansion, which he erected about a year ago on the Chelsea Embankment. We illustrated the house fully at the time, and a most elaborate and highly-finished residence it is. All the fittings are executed in a costly way from the designs of the architect, Mr. Joseph Peacock. The theatre now building is also from this architect's designs, only, instead of a Gothic style, like the house, a sort of Free Classic or Queen Anne combination has been adopted for the front elevation, which is being carried out in stock brick, with red cut brick dressings enriched in the central feature by stone pilasters and rusticated quoins. The building is to be complete in every respect, having an auditorium of horseshoe form on plan, with boxes on either side and gallery above. The stage has a frontage of about 25ft., and the building stands on a site nearly 70ft. by 60ft., the latter being the width of the front in Tite-street. To the rear a green-room, with painting-rooms and offices, are arranged, including a carpenter's shop, which has an entrance from the next street. The contract for the chief part of the theatre is between six and seven thousand pounds, but ten thousand is said to be the probable outlay before the whole is completed. The builders are Messrs. Lathey Bros., who also built Sir Percy Shelley's mansion above referred to, the drawings of which will be found in the BUILDING NEWS for January 4th and February 1st, 1878.

In the adjoining mansions, erected by Messrs. Gillow from the designs of Mr. E. W. Godwin, we see the workmen are at work making the principal rooms in the big house at the corner more convenient, it having been found that the serious objections found by everyone who saw them quite prevented their sale. The faults were inherent in the original plan, seeing that no really good-sized apartment was provided beyond the billiard-room. This being the case, Messrs. Gillow, at considerable expense, are recasting the interior by throwing the front rooms into one fine apartment, both on the ground and first floors, and, instead of the

recessed bay which occasioned the original sacrifice of room inside, a projecting oriel window is about to be formed, thus adding considerably to the value and convenience of the house. Mr. Adolphus Croft is the architect under whose direction the alterations are being made.

CONICAL ARCHES.

IN a paper by Mr. D. McH. Stauffer, C.E., in the *Proceedings* of the Engineers' Club, Philadelphia, on the South Street Bridge of that city, the author describes some novel points in the eastern approach to the structure. It is the ordinary practice in constructing arches on the curve to widen the piers towards the outer circle of the bridge, leaving the arches "right arches." In the case of the South Street bridge it was thought, and very justly, that the work would be improved in appearance, and a considerable saving in masonry effected by making the piers of the same thickness throughout, and throwing the obliquity into the arches. The roadway was 55ft. wide, and the centre line of the curved portion in which three arches were made was struck with a radius of 169ft. 6in., with an included angle at centre of 33° 25'. The arch abutments therefore formed tangents to the curve on plan. Both of the two piers were 6 course 55ft. long, and had a thickness of 5ft. 6in. and 12ft. high to springing. On the radial lines of the curve the piers were located, their sides being parallel thereto. Each of the three arches had a chord span at the inner end of 22ft. 1in., and at the outer end 32ft. 9in., the rise of arch being 11ft. 4in. throughout, and the crown and springing line being horizontal. Each arch in fact is really a portion of a cone; thus the line of crown of arch would coincide with the oblique side of the cone, while the plane of springing line would be parallel thereto, and cut the axis of cone at the smaller end of the arch. Thus the rise of arch at the smaller end was equal to one-half its chord span. As the crown and springing of the arch were parallel and coincided with slant height of the cone, the ends of arch were not vertical, and had to be cut at right angles to the cone, though the angle made was so nearly a right angle that they were treated as circular arches. The smaller arch was regarded as a full-centred arch, and the larger as a segmental arch. Maine granite was used for the ringstones, and hard burnt bricks for the arch proper. The brick ring was 24in. thick laid in cement mortar, and the bond was arranged so that the thickening of the mortar-joint was confined to the length of one brick, and the bond made to repeat itself in every eight courses. The consequence of the arch being treated at each end differently was of course that a winding skew-back was produced, but in execution the skew-back was made to approximate to this by a series of slight drops or steps every four feet, and enting the face of skewback to suit. This method of construction is at least bold and novel, if not the most artistic mode of dealing with a row of arches in a curved bridge or viaduct; and we recommend to the reader a perusal of Mr. Stauffer's paper, which is illustrated, and enters into details of the centreing employed and the materials used. The result is said to be successful, while the appearance is manifestly better than the old method.

The Cambridge Slade Professor of Fine Art (Mr. Sidney Colvin) announces the subjects and dates of his lectures as follows:—Tuesday (last), "On Some Greek Terra-cotta Figures in the Fitzwilliam Museum"; May 16 (to-day), "On Some Drawings of Old Masters in the Fitzwilliam Museum"; Friday, May 23, "On a Cast of a Statue of Hermes, by Praxiteles, in the Fitzwilliam Museum"; Tuesday, May 27, "On the Engravings of Martin Schöngauer in the Fitzwilliam Museum"; Friday, May 30, "On Some Ancient and Modern Conceptions of Landscape, Illustrated by Pictures in the Fitzwilliam Museum."

It is proposed by Mrs. E. M. Ward to supply a want which has been greatly felt in this country in the shape of a School of Art to which ladies can send their daughters to learn painting and drawing. For this purpose she has obtained the kind co-operation of Mr. P. H. Calderon, R.A., Mr. J. C. Hook, R.A., Mr. W. P. Frith, R.A., Mr. J. C. Horsley, R.A., Mr. J. E. Millais, R.A., and Mr. L. Alma-Tadema, R.A., who have consented to visit the school once a month, thus securing to the pupils an advantage which it would be impossible to obtain elsewhere.

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ILLUSTRATIONS.

NEW CATHEDRAL AT MELBOURNE.—THE HERTFORD HOSPITAL, PARIS.—NEW BOAT HOUSE, CAIUS COLLEGE, CAMBRIDGE.—WAREHOUSES IN BARTHOLOMEW CLOSE, LONDON.—BILLIARD-ROOM, KILBURN HOUSE.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NEW CATHEDRAL, MELBOURNE.

By the courtesy of the architect, Mr. William Butterfield, we are enabled to give illustrations this week of the proposed cathedral for the Church of England in Melbourne, Australia. It is to be erected of stone in that city, upon a site upon which St. Paul's Church, parsonage, and schools now stand. It is hoped that a hundred thousand pounds, equivalent to about sixty-five thousand pounds in England, may be raised for this purpose. A large portion of a cathedral at Adelaide, Australia, has been already built from Mr. Butterfield's designs, and was consecrated about fifteen months since. In an early number we intend to give some further illustrations of the Melbourne Cathedral, including the sections, so that the principal of the general working drawings of this important building will be placed before our readers.

THE HERTFORD HOSPITAL, PARIS.

A FULL description of this building will be found on p. 549.

CAIUS COLLEGE BOATHOUSE, CAMBRIDGE.

THE boathouse for Caius College Boat Club has been built on the left bank of the river, close to the Ferry. It is built with red brickwork, and the gables are finished with panelled plaster. It is set at an angle to the river in order to bring the boats conveniently down to the landing stage, by this means also a better view of the river is obtained from the windows. The ground-floor is arranged for the stowage of boats. The first floor is divided into two dressing-rooms, one for the first crew, and the larger one for other members, and a balcony is arranged in front where members have a good view of the river. It is being brought into use during the boat races of the present week.

WAREHOUSES, BARTHOLOMEW-CLOSE.

THIS building stands on an area of over 8,000 square feet, and occupies a very open position in Bartholomew-close, replacing three houses which had been converted into a warehouse, but which were found ill-adapted for the purposes of the business, namely, that of a wholesale druggist. In the new building the clerk's offices are placed at the corner by the main entrance on the ground-floor, the private offices being over them, one having a bay window commanding a good view over the Close; at the other extreme of the build-

ing a residence is provided for the head warehouseman. The basement is occupied with oil-cellars, bottle-washing department, engine, boiler-rooms, &c.; the remainder of the floors being occupied by the many various departments required for the business. For the receipt and despatch of goods a double cartway is provided. The principal elevations are executed in red brick, the roofs being tiled. Each floor will have a hydrant served from the high pressure main. A 2-ton steam lift is being fitted up from basements to fourth floor. Mr. Aston Webb is the architect.

BILLIARD-ROOM, KILBURN HOUSE.

WE this week publish an interior view of a billiard-room, erected as an addition to Kilburn House, Kilburn, N.W., the residence of John E. Farmer, Esq. The room is about 30ft. long by 20ft. wide, and 24ft. high to the top of the circular ceiling. It is approached from the old part of the house through a new hall, adjoining which is provided a lavatory for the use of the players. The ceiling is executed in the form shown in pitchpine, the wall and window linings, also the doors and other wood finishings are executed in pitch-pine, all French polished. The chimney-piece is in oak. The table has been made to the architect's special design by Messrs. Burroughes and Waits. The ornamental glass in windows, representing different sports and pastimes, has been executed by Mr. Dixon, of University-street. In addition to the open fireplace fitted with dog stove, hot-water pipes on Perkins' system are fixed behind the skirtings. The whole of the works have been designed by Mr. Rowland Plumbe, F.R.I.B.A., architect, of 13, Fitzroy-square, W., Mr. T. J. Messom, of Twickenham, being the builder.

THE ART OF THE ITALIAN RENAISSANCE.

DR. TODHUNTER on Saturday afternoon delivered the last of his course of lectures on this subject in the New Buildings, Trinity College, Dublin. He commenced by pointing out how the Siennese school of the fifteenth century became merged in the Umbrian school which culminated in Perugino. Vasari stated that Perugino worked for some time with Leonardo and Lorenzo, where he perfected his perspective studies and colour system. He was a very successful painter of the period. Perugia was a city of Mediæval Italy; and Perugino was himself Mediæval. His art was in spirit retrospective. How far he was a religious man seemed doubtful. Vasari said of him he possessed very little religion, and could never be made to believe in the immortality of the soul; that he placed all his hopes in the goods of fortune, and would have undertaken anything for money. There was also a tradition that he died without the rites of the Church, and was denied Christian burial; but that seemed to have been owing to his having died suddenly of the plague, for the monks afterwards had his body transferred to Florence, and honourably buried there. Whether he was a religious man or not he was eminently a religious painter. Mr. Ruskin, indeed, had laid it down that, in order to be a religious painter, one should be a religious man, and deduced Perugino's piety from his pictures. It was, indeed, all but impossible to believe that the man who painted pictures so full of devotional feeling as those of his best period could have been without the feeling thus expressed; but in some of his later works the feeling seemed of a rather artificial kind—sentimentality rather than sentiment. But granting that he was often guilty of the faults of affectation and mannerism, there yet remained in his work a mysterious fascination—an abiding charm—which work that was insincere and mechanical could never produce. His best pictures were steeped in an atmosphere of divine peace, and he was more ethereal and ecstatic than Bellini. He seemed to sigh after an ideal state of serene and holy joy. One remarkable thing in his pictures was the important part which landscape played in the general effect. His landscape, like that of Titian, carried out and emphasised the sentiment of his figures, while it was at the same time clearly Perugian, while that of Titian was Venetian. Perugino's great pupil was Raphael. In Raphael, not merely the Umbrian, but the Florentine school of the sixteenth century culminated. If

a man's originality could be questioned because of his being indebted to others, Raphael was the least original of men. Shakespeare himself was not a more voracious parasite upon the genius of other men than Raphael. As compared with Michael Angelo, Raphael was rather an adapter than a creator, though the former stole something from Signorelli; but Raphael's genius appeared in the magnificent manner in which he dealt with his thefts. He was not a mere adapter, but was a recreator, dealing with the works of other men much as they dealt with the works of nature. It was chiefly as a consummate master of composition that he shone supreme. In other qualities it could not be said that he excelled the men whom he copied. Perugino was very much his superior as a colourist; Michael Angelo's sublimity was altogether out of his reach, and even as a draughtsman Raphael was not always perfect. Raphael's father, Giovanni Sante, of Urbino, was himself a painter of respectable attainments. The lecturer described several of Raphael's principal works, and said the amount of pictures he painted during his short life—for he died at the age of thirty-seven—was simply astounding. The art of the men of the post-Raphaelite, through often technically fine, was essentially debased and decaying. Although Ruskin was in the main right in tracing the decay of Italian religious art to the decay of Italian religious faith, it was nevertheless a fact that the glorious non-religious art of the Renaissance died out *pari passu* with its glorious religious art. The later painters were no less feeble in treating Pagan than Christian subjects.

PICTURE FRAMES.

IN the picture galleries now open to the public, many striking examples of gilt frames are to be seen, and these are well worth the attention of the artist and connoisseur. There is more than is at first sight apparent in a frame. It has not merely to form a setting to the picture; it ought to be in harmony with it. A picture in a low scale of colour is spoiled by a bright gold margin; while for a painting glowing with bright and intense colours, a large gold frame is the best corrective. Some paintings look better in a dull, unburnished gilt frame, others in burnished ones; but the shape, ornament, and moulding have much to do with the effect. For decorative subjects, the common rococo frame of the old style is often completely ruinous, and we contend that the style and sentiment of the painter's work should be considered in the designing of frames. Happily, a few of our leading painters are beginning to look at the matter in this way, and we observe several striking departures from the conventional style of the picture-frame maker. We may draw attention to the frames surrounding Mr. Edwin Long's fine subjects this year in the Royal Academy. His "Esther" (102), and "Vashti" (955), have frames of exceedingly suitable design, and several other very pleasing models may be observed. In the Grosvenor gallery we notice some very admirably designed frames round the pictures of Mr. Whistler. His "Arrangement in brown and black," and "Harmonies in yellow and gold, and green and gold," have a quite unconventionally designed frame, composed of a prominent flat face with projecting edgings of reed-like mouldings, thickly grouped together at the inside where they retire to the picture plane. We certainly see more to admire in the gold frame than in the sensational "Gold Girl" herself. Flat frames with reeded members are also well adapted for architectural drawings, and we notice some good examples of framing in the architectural gallery. Architects know the value of good frames, but artists have not till recently appeared similarly alive to their importance.

Last week the Lytham Commissioners advertised for tenders for some sewerage works—1,634 lineal yards of 24-inch and 21-inch earthenware sewers, the earthenware pipes and manhole-covers to be found by the Commissioners, and all other materials to be provided by the contractor. The highest tender was £1,590, and the lowest £650; only the small difference of £940.

At Waterford Presentment Sessions, on Saturday, compensation to the amount of £1,200, was awarded to Mr. George Walker, builder of the Waterford Convent, which was partially destroyed by fire in January last. The fire was held to be malicious.

THE BUILDING BEGINS MAY 16, 1879.

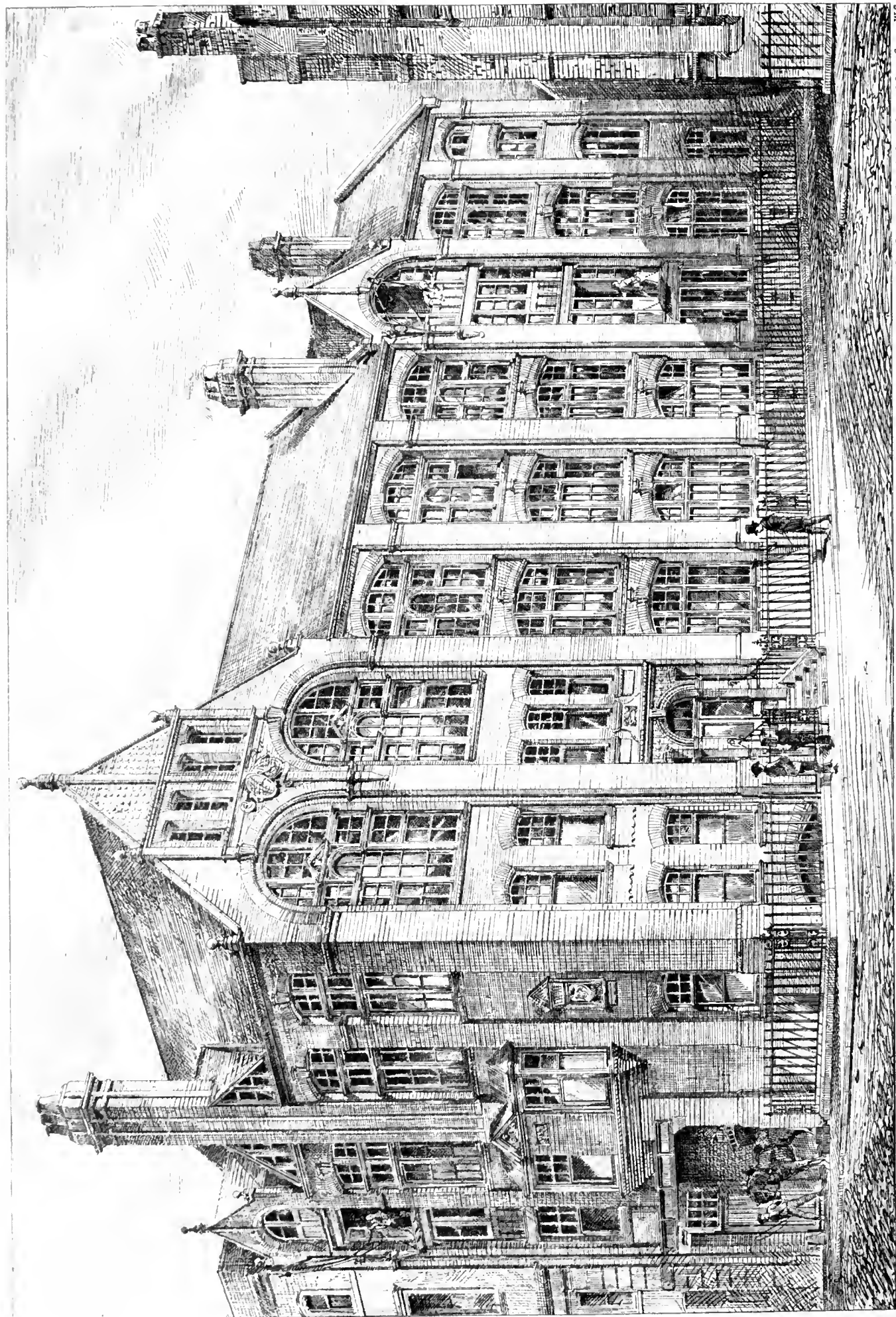
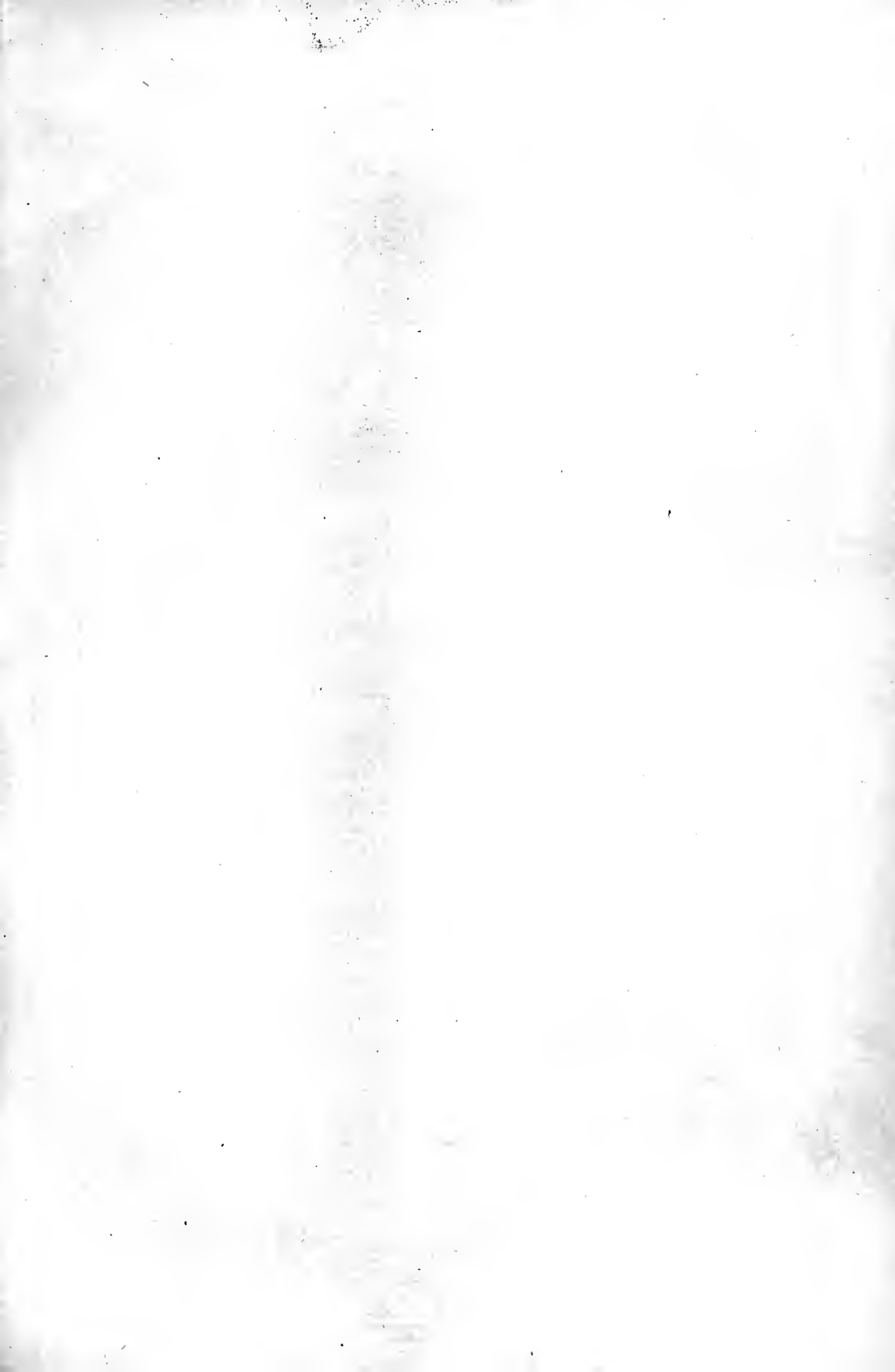


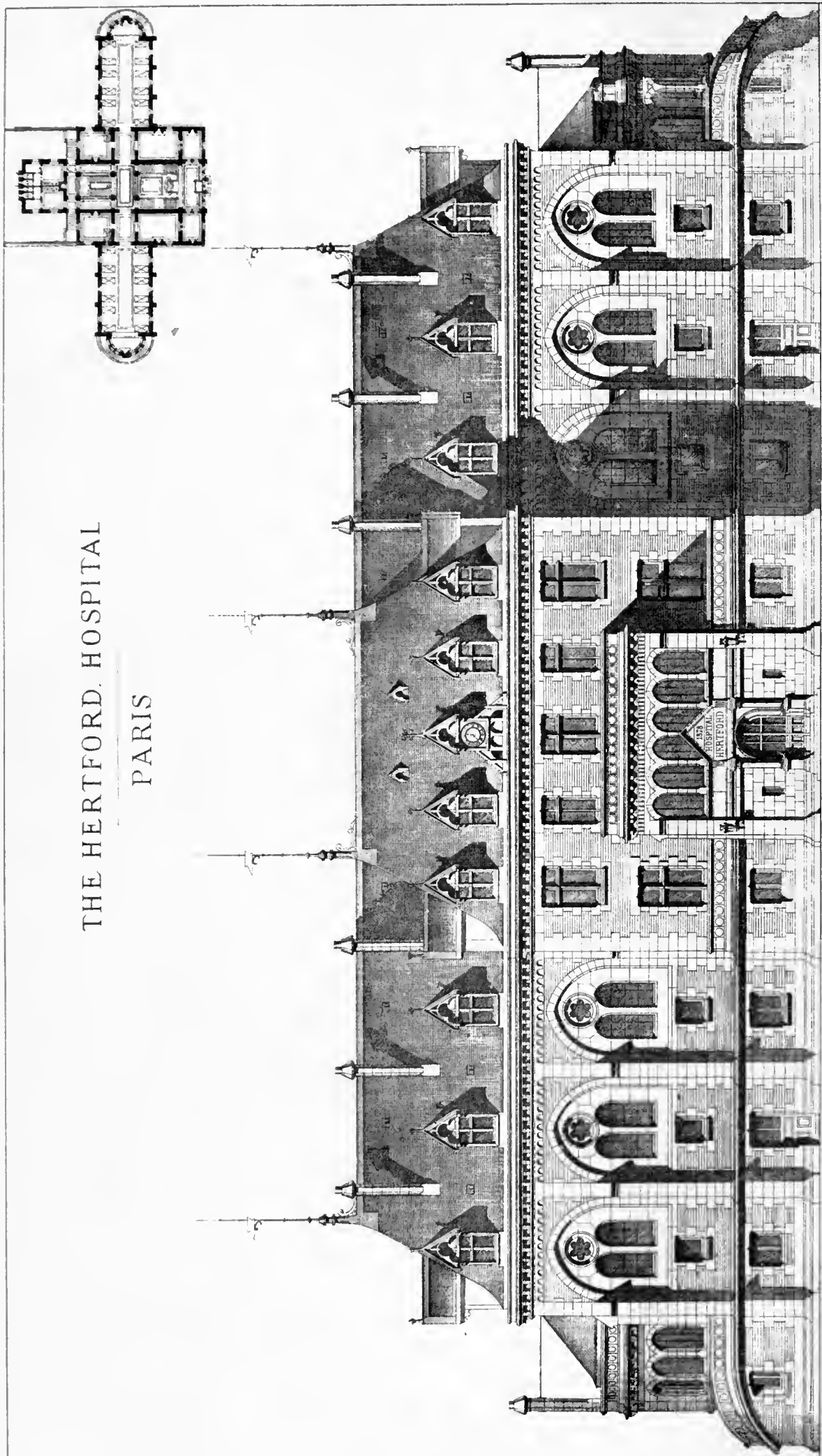
Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

WAREHOUSES 60 BARTHOLOMEW CLOSE CITY E.C. NOW ERECTING ASTON WEBB ARCHITECT

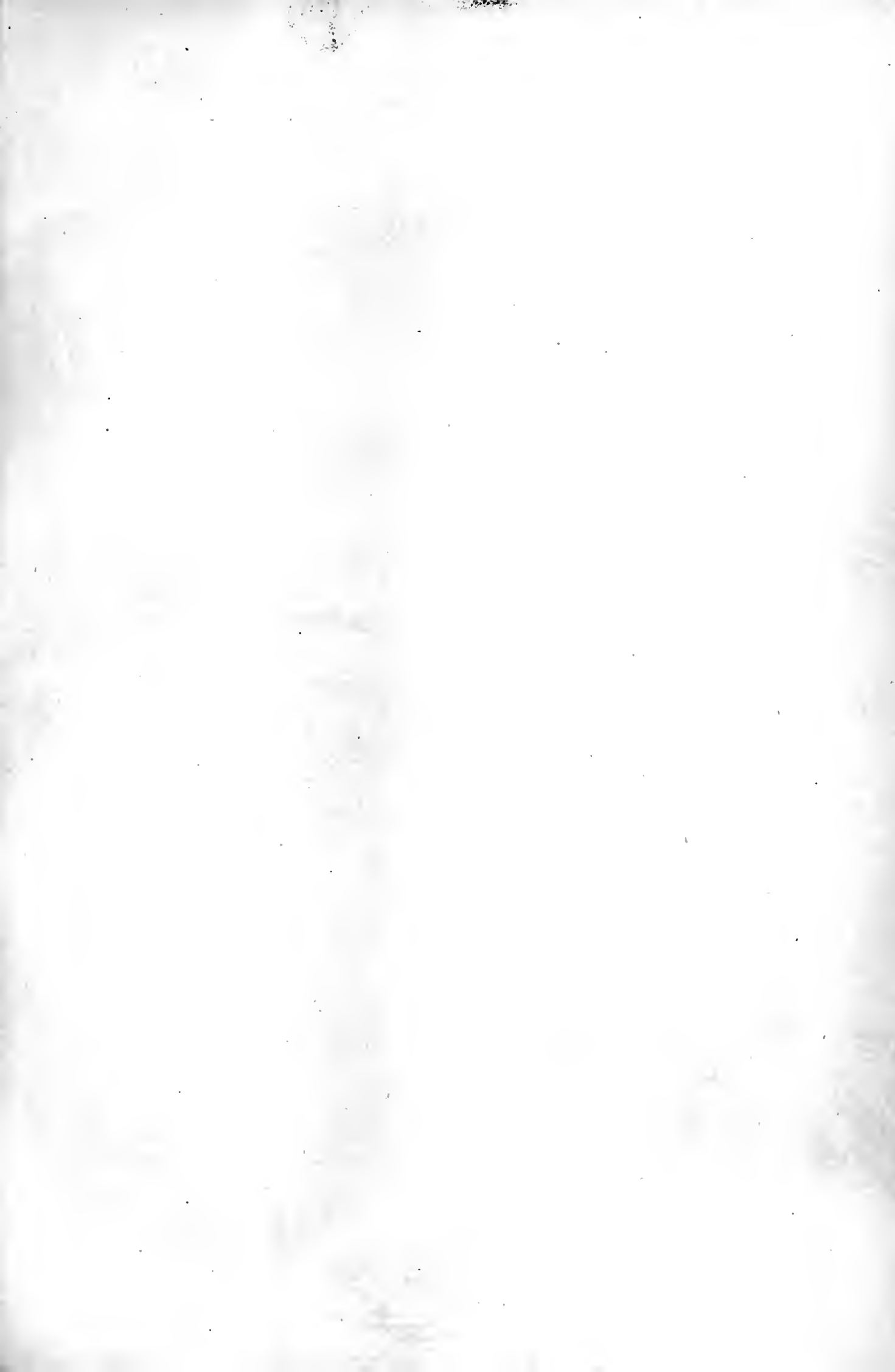


THE BUILDING NEWS MAY 16, 1879.

THE HERTFORD HOSPITAL
PARIS



FAÇADE RUE DE VILLIERS.

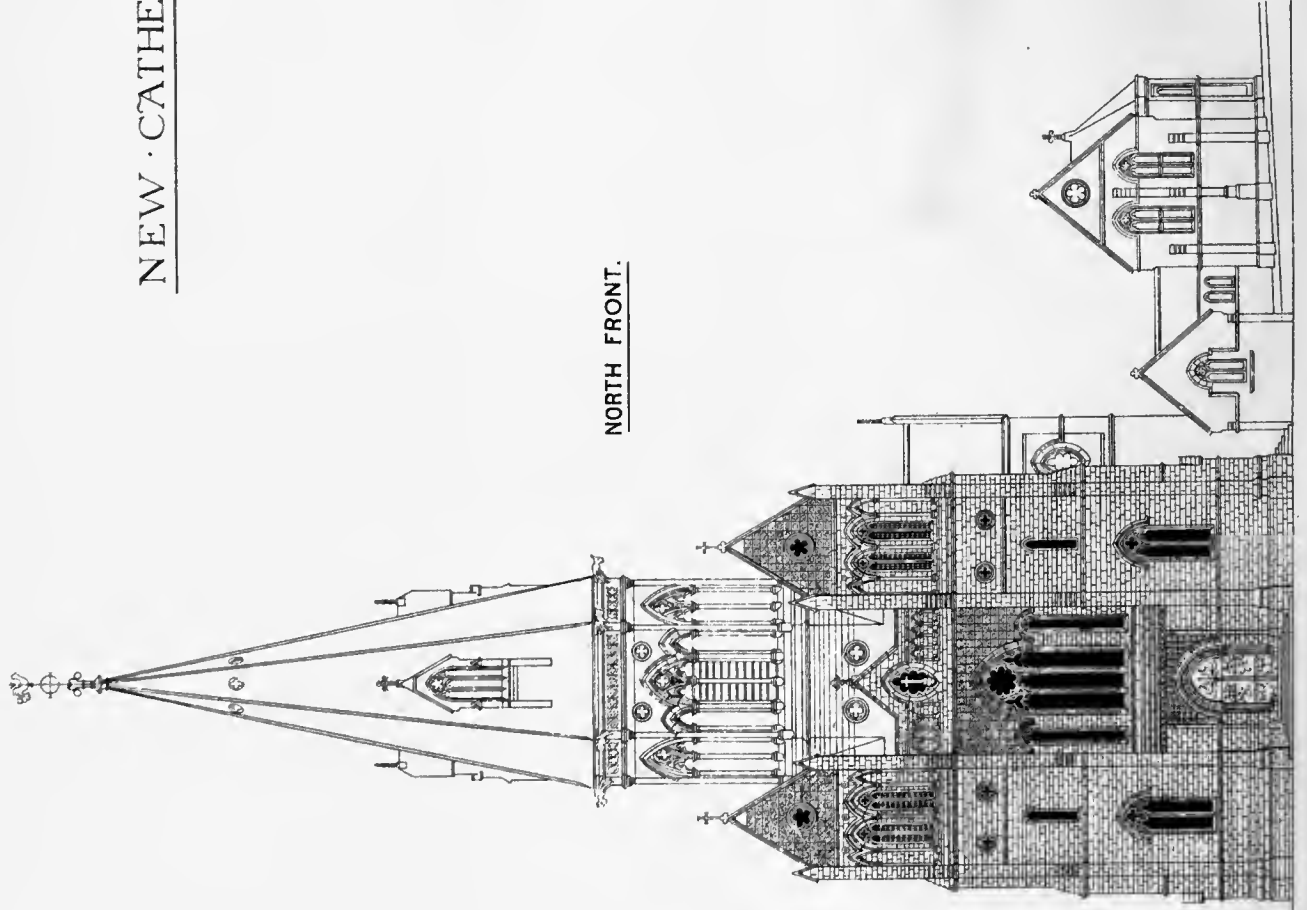


NEW CATHEDRAL

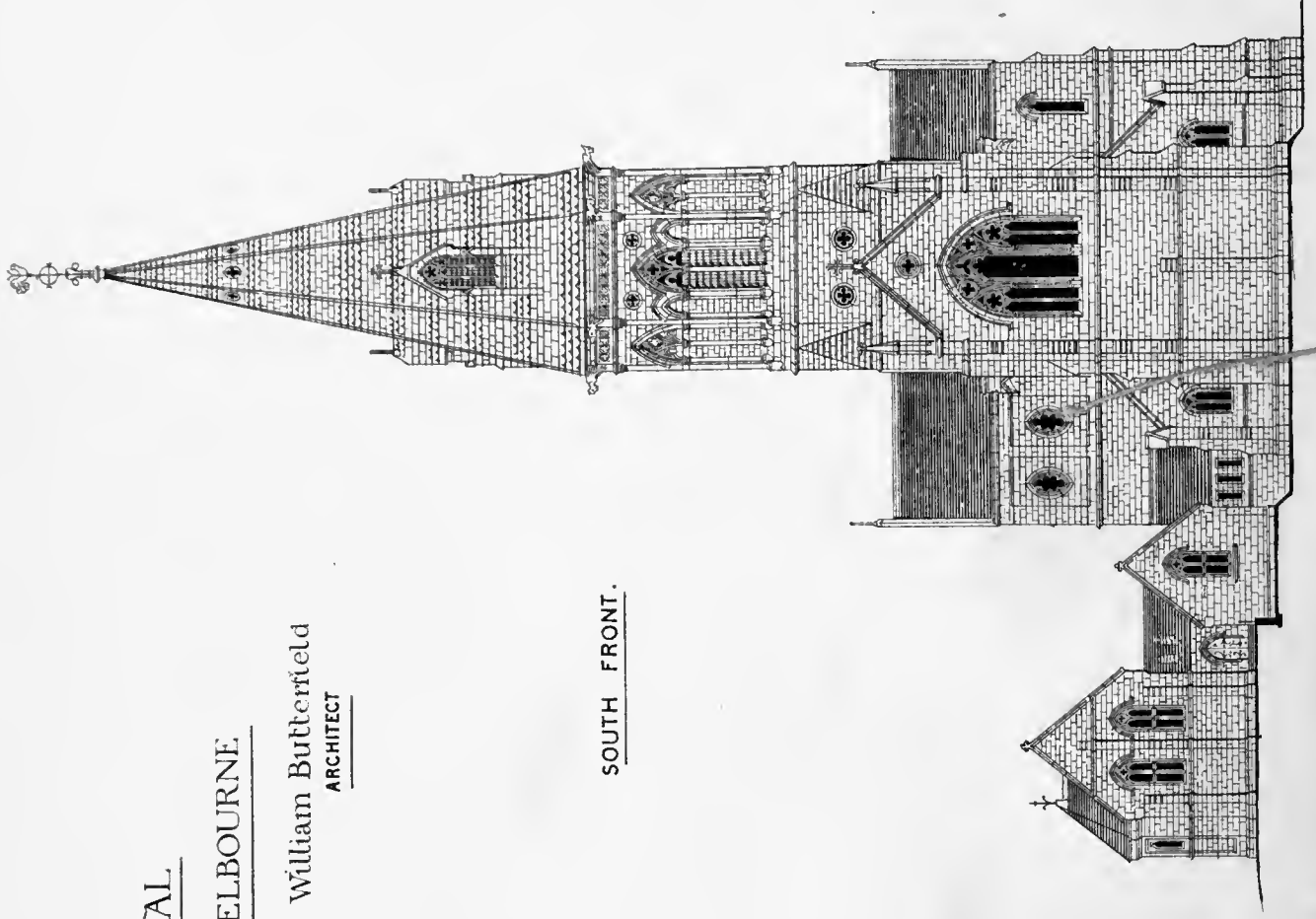
MELBOURNE

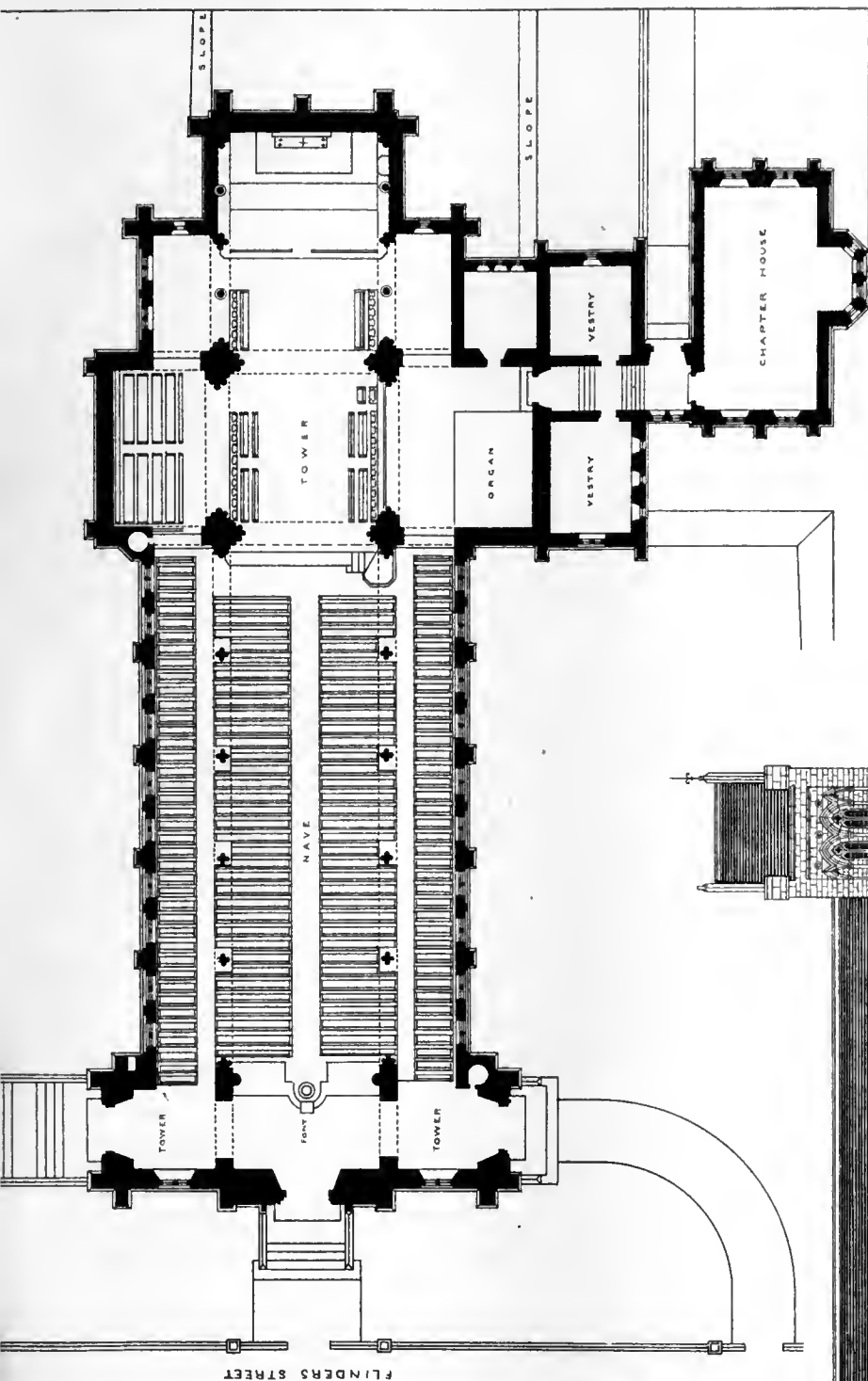
William Butterfield
ARCHITECT

NORTH FRONT.



SOUTH FRONT.



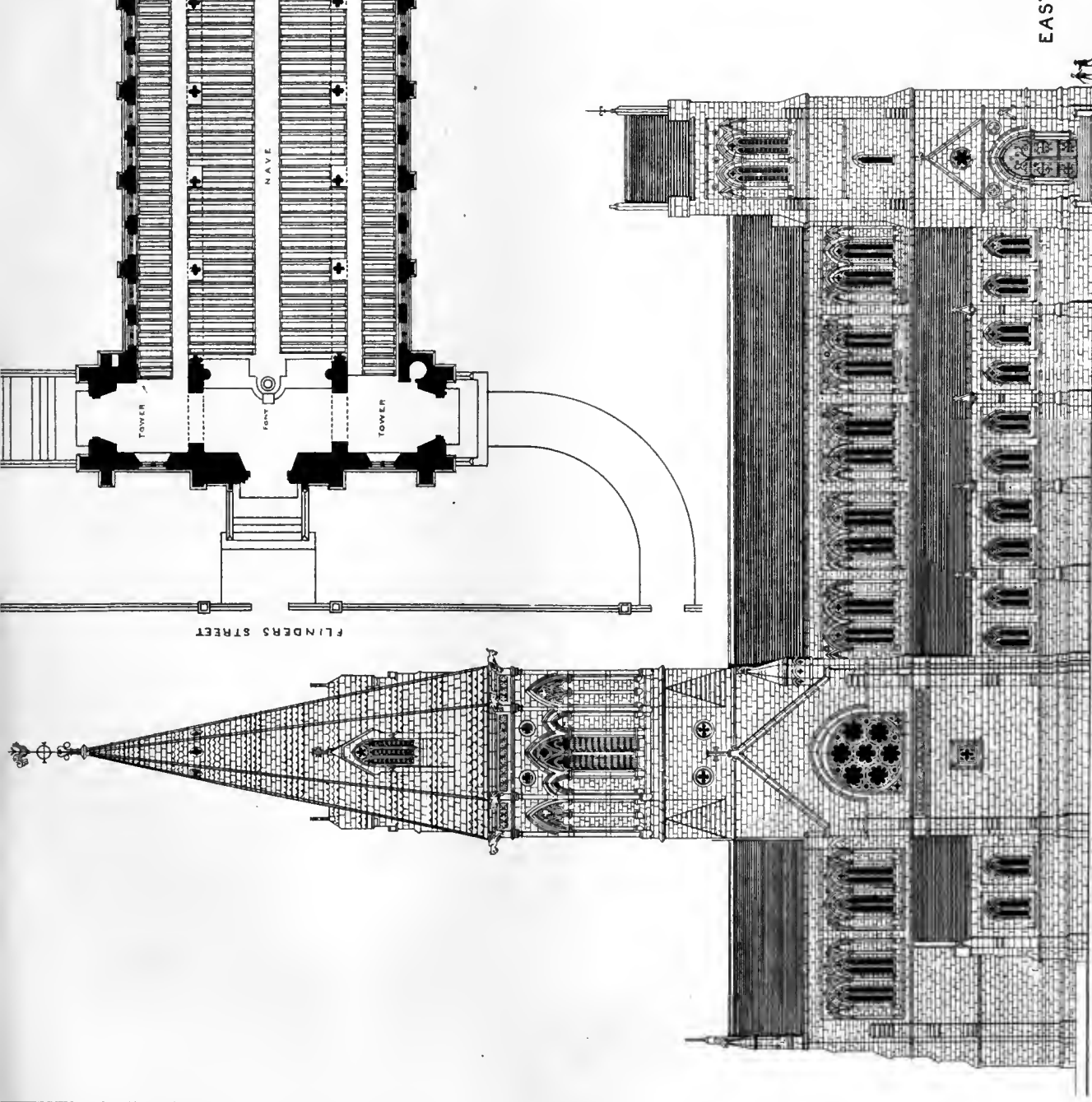


GROUND PLAN

SCALE OF FEET

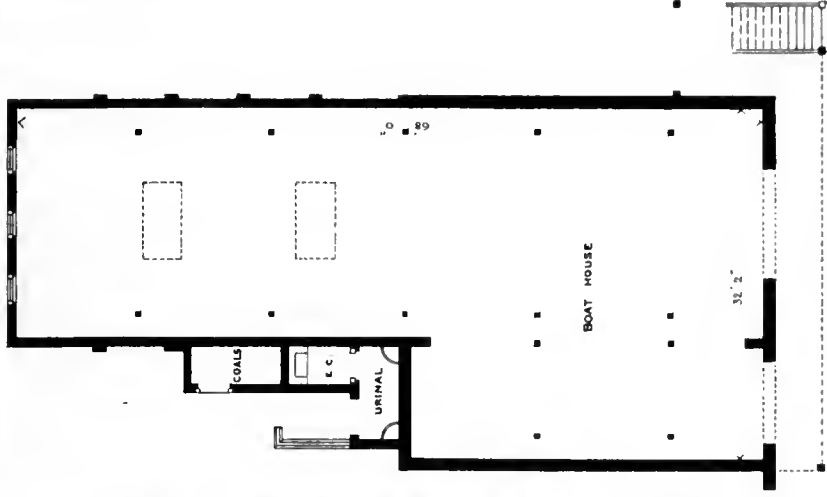
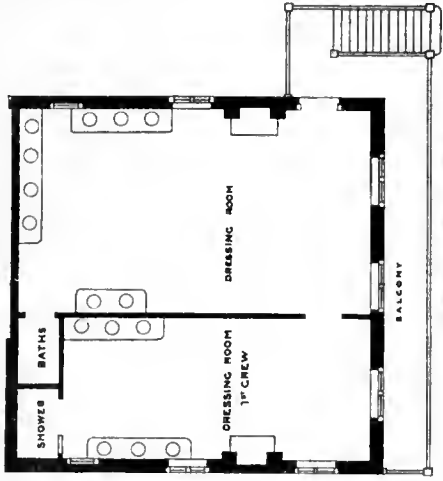
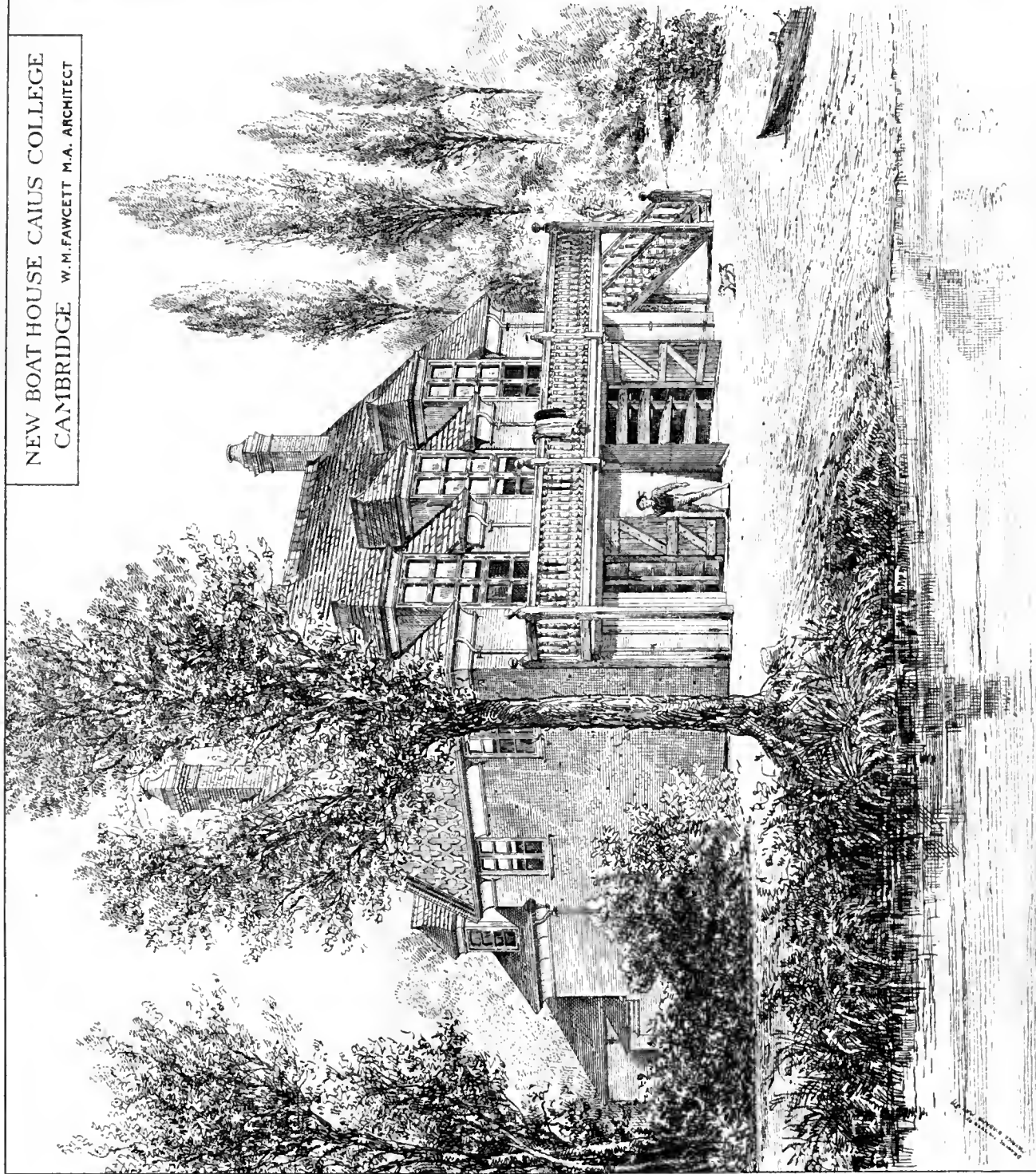


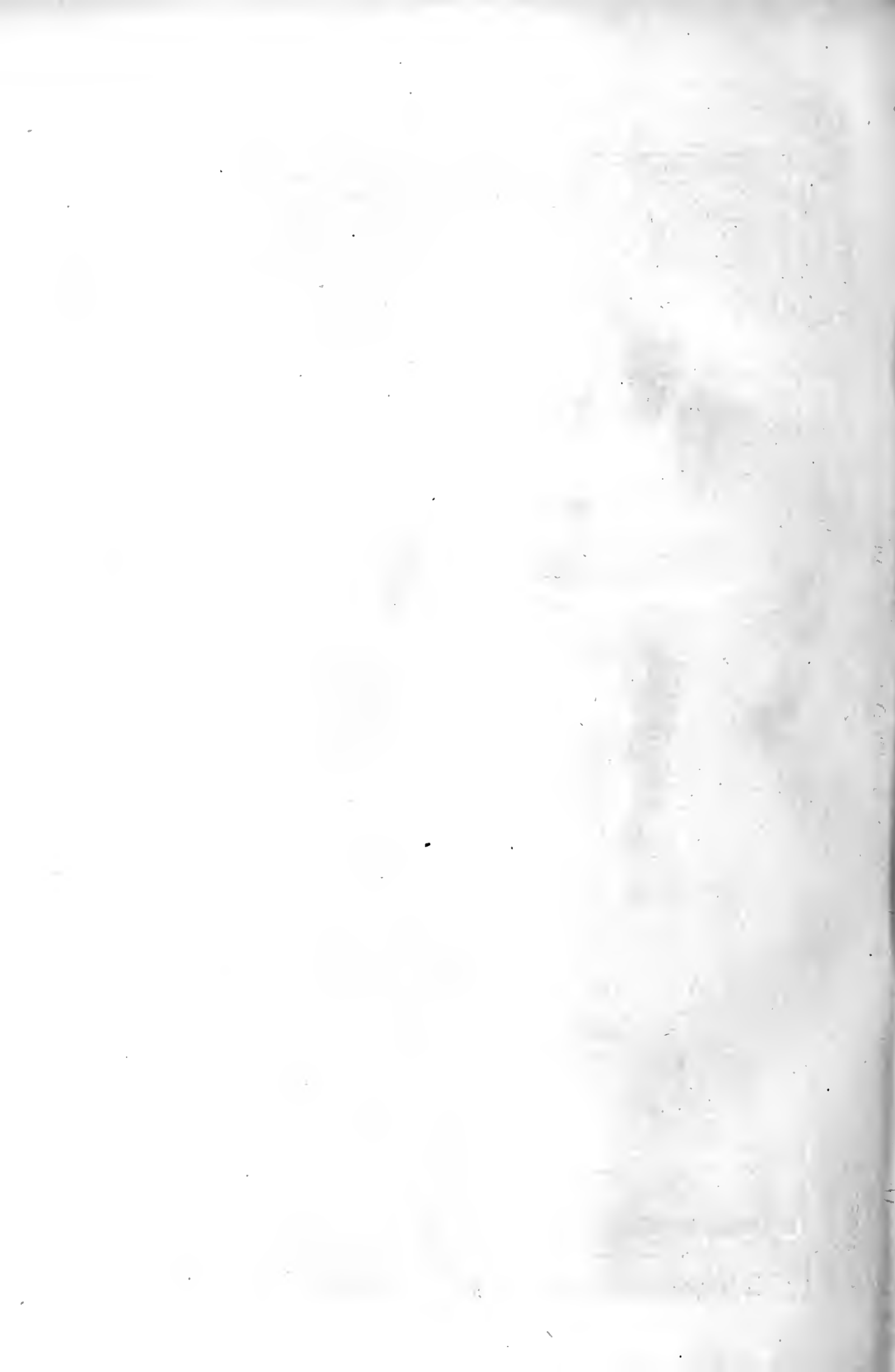
EAST ELEVATION

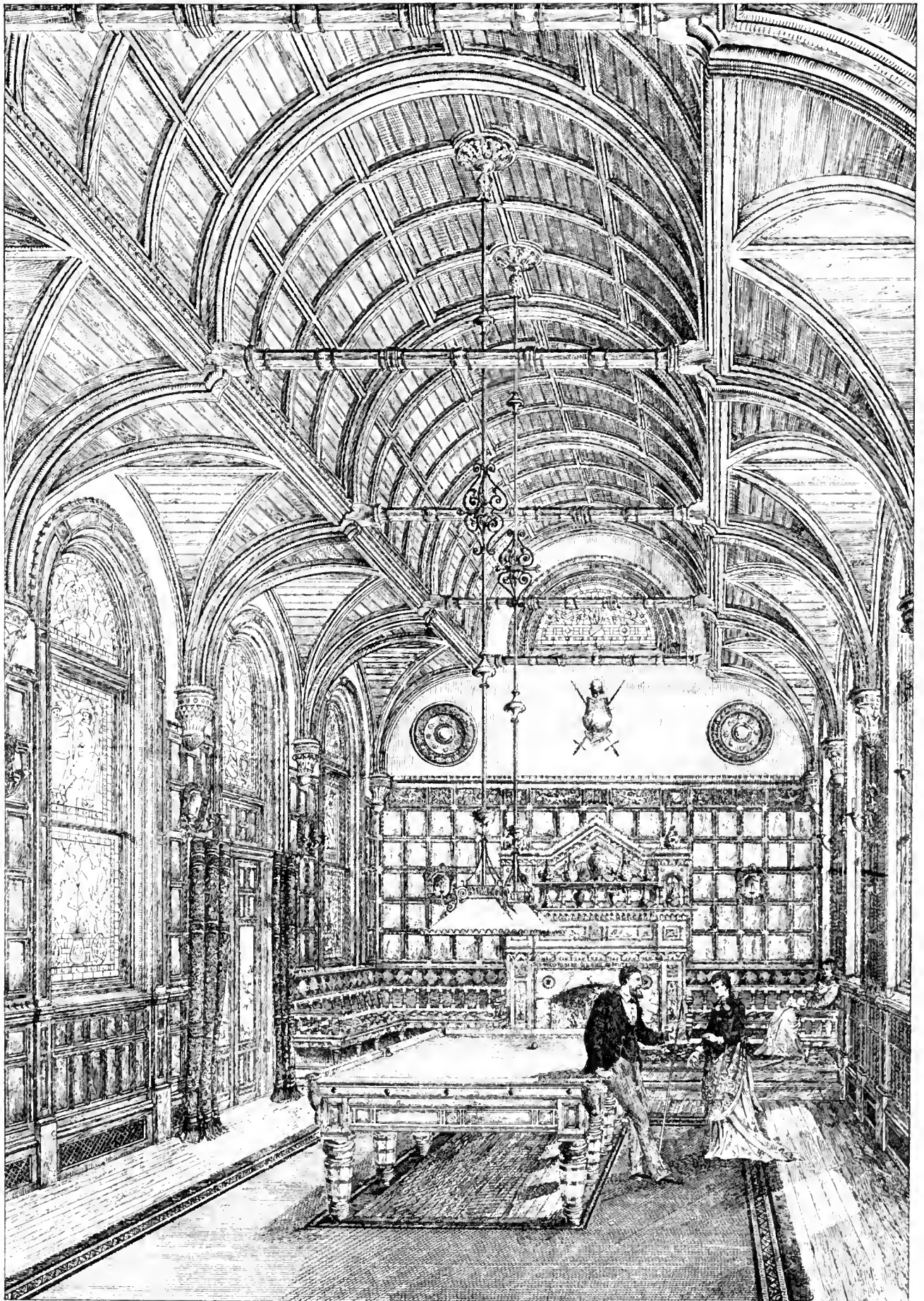


THE BUILDING DEWS MAY 16, 1879.

NEW BOAT HOUSE CAIUS COLLEGE
CAMBRIDGE W.M.FAWCETT M.A. ARCHITECT







Photolithographed & Printed by James Akerman, 10 Queen Square, W.C.

Interior of Billiard-room Kilburn House ROWLAND PLUMBE ARCHT

THE HERTFORD BRITISH HOSPITAL
IN PARIS.

THE illustration we publish to-day of this handsome building is particularly interesting, as illustrating a most carefully designed public institution, and a noble gift by an Englishman to the service of his poor countrymen in a foreign capital. It is very generally known that during the siege of Paris by the German army, Sir Richard Wallace established an "Ambulance Anglaise," of which we need say no more here than that it was greatly appreciated by our neighbours, the French. But at the same time there grew up great need of medical help and aid for the indigent English who remained, and hence in connection with the ambulance, and in premises adjoining a temporary hospital and dispensary was started by Sir Richard. The sufferings of his countrymen during the German siege, and the subsequent siege by the Versailles troops, induced the honourable baronet to determine on founding a permanent hospital where poor people of British nationality might go and have their maladies cured or alleviated by skilful physicians, under the care of trained nurses, of their own country, and where they would be comfortably provided for. From that time, entirely at his own sole charge, such an establishment has been maintained by Sir Richard under the name of the Hertford British Hospital, receiving patients and dispensing medicine and advice free of all charge. After eight years of temporary shelter in a house rented for the purpose in the Route de la Révolte the splendid pile illustrated in our paper to-day has been dedicated as a place of permanent occupation, at a cost, we believe, exceeding £40,000, besides the considerable sum to be set apart for its ample endowment. The foundation-stone of the building was laid by Sir Richard and Lady Wallace on the 24th August, 1877, being the seventh anniversary of the death of the late Marquis of Hertford, to whose memory and in honour of whose generosity it has been built. On the 16th of last month it was formally inaugurated by the honourable baronet and his lady receiving the British Ambassador, Lord Lyons, and several invited guests, when it was dedicated to the exclusive use of British poor persons, and entrusted to the care of a small committee consisting of Sir John Rose Cornack, M.D., the Hon. Alan Herbert, M.D. (the two physicians), and Mons. Levopene, of the Boulevard des Italiens. Contagious or manifest incurable cases are not eligible for admission, but all classes of accidents requiring immediate attention are promptly attended to. The physicians alone decide on suitable cases. The hospital is situated at Levallois Perret, where that village forms a junction with the well-known suburb of Neuilly, five minutes' walk beyond the fortifications. It stands on a rectangular plot of ground of 7,225 square metres, the front opening to the Rue Villiers. Without the least participation on the part of either of the two townships, Sir Richard Wallace built at his own cost more than 3,000 metres of sewers, so as to secure more completely the salubrity of the establishment. An iron railing faces the front entrance, and a large open space forms a carriage way to the central building. To the right and left are extensive gardens. Ascending by three steps we enter a large hall of such considerable dimensions that we are at once struck with the grand scale on which the building has been designed, and these spaciousness and lofty dimensions continue a marked feature throughout. To our right is the porter's lodge, and the fine flight of stairs leading to the men's department; to the left a parlour for the use of the lady-superintendent, and the steps leading to the apartments for women. In the centre, between the two flights of staircases supported by arches, the hall continues on a level of six steps below the entrance. To the right of this is what is called the council chamber, used also for a library. A large opening leads to the aisles and to a sitting-room for unoccupied nurses, from which they can see what is going on in the two consultation rooms. Here, too, is a door which leads to the waiting-rooms for out-door patients, which are entered also by doors from the garden. Both these waiting-rooms are in communication with the pharmacy and consulting room, and each has an enclosed portion for patients whose cases require them to remove

their clothes. The two openings facing the entrance lead to the northern aisles. In the centre are stairs connecting all the floors with that portion of the building, and an elevator is fixed just opposite, available either for the lifting up of patients or other purposes. To the right a room for general purposes, and at the extremity the well-arranged and appointed kitchen, touching the building only on one side. To the left is a capacious larder and scullery, and further on we come to the hydropathic department, most expensively and completely furnished with baths of all kinds, established more especially for the use of out-patients, and this building has an entrance from the garden, so that such bathers enter without passing through the main building. Returning to the entrance hall, we find a plain but commodious chapel on the left, opposite the council-room; then, ascending to the right, we penetrate the apartments for men, entering the large hall, or chief ward, through a small ante-chamber giving access also to a small nursery-room in which are two side closets, with a supply of hot and cold water, a linen cupboard, and a bed, occupied by a nurse, who, by means of a small window, can at any hour of the night glance through the chief ward, which has twelve beds, two of which are designed for children. This ward is of the height of two stories, and three bays of joists divide the vaulted ceiling. In each bay, at the height of the eye, a window affords the patients a view of the surrounding country; above a band, running more than two metres from the floor, are two coupled ogival windows, crowned with a *rosare*, allowing light freely into each bay. The ventilation of the chamber is well provided for, and the physician has it in his own control. The extremity of the room is finished off by a large, open fireplace, with a faience trimming, where drinks may be kept warm. On each side of the fireplace are three ogival openings, one of which forms a door leading to a stairway connecting the ward with the garden. Under each window is a small opening for the introduction of draughts when desired, and between each bay are ventilators, put in motion by a gas-burner, hid by day by stained glass windows, and which at night are used as night-lamps. The ward (as well as every part of the building) is heated by hot-water tubes, covered with a grating. Returning to the landing, we find adjoining a reserved ward for special cases requiring isolation or special attention, and this is at present fitted with three beds, in a space, however, in which not uncommonly twice that number are placed. A door leads out of this room on to a terrace. Passing by other bath-rooms, water-closets, &c., we proceed to the section for women, which in all its arrangements is precisely the same as the men's. It should be stated, however, here that the staircase in the centre is well lit from the top and well ventilated. Opposite the entrance on the first floor are rooms for patients who may have to undergo operations, with an ante-room for a nurse, and these also have access to a separate balcony. The apartments of the house-surgeon and the lady-superintendent are spacious and commodious, and are so arranged that they can each have under their inspection at any moment the separate departments. On the upper floor are comfortable rooms for nurses and servants, and linen-rooms well stocked with every article of clothing, for patients here all wear a wardrobe provided for them by the establishment, and there is here also a bath-room for the special use of the servants. An electric clock gives the time in all parts of the hospital, and a public clock, which is provided with means for night lighting, is fixed in the roof. It is hardly necessary to say that the operating-room, and in fact, every department, is fitted with the most approved appliances for the use of the operator and the convenience of the patient. There is no paint used in the building; all the wood is varnished pitch-pine. From the northern aisle, and communicating with the court by two stairways, is a large avenue closed with two railings, leading to a mortuary, which besides an apartment for the dead has also an autopsy room, a room for the reception of dirty linen (which is sent out for washing), a room for the public and for prayer before the removal of a corpse. A small enclosed court separates this building from the public thoroughfare, into which access is gained in the Rue Chaptal. The architect is Mons. Sanson, of the Rue d'Anjou St. Honore, Paris.

THE PRESENT ART REVIVAL.

At a meeting of the Edinburgh Architectural Association, held on the 7th May, a paper, entitled "Notes on the Present Art Revival," was read by Mr. Thomas Bonnar. He began by alluding to the practical tendency prevalent at the present time, by which it is attempted to gauge and define that most subtle and æsthetic of subjects, "artistic taste." Deprecating these efforts, he went on to refer to the great advantages possessed by our Continental neighbours in the ready access they have to the innumerable authorities and examples they are encouraged to study, while we, as a nation, are still struggling with the many difficulties which must be overcome before attaining a high artistic position.

To the inattention and indifference to artistic matters which frequently assume the shape of wilful neglect might be attributed much of the ignorance of the real constituents of art which prevailed; but this is now being remedied, and the principles which govern the true expression of art in pictorial, architectural, and domestic application are receiving that study which they so deservedly merit, as well as obtaining from the public a high appreciation of its qualifications.

The Free Classic, or Queen Anne, style was commended in preference to the Gothic, from its more appropriate character, and the facility with which it could be adapted to the interior embellishment of the most stately, as to the most unpretentious, of buildings; besides the advantages which it possesses of affording a medium for the artistic use of colour in decoration and furniture, while guarding against the indiscriminate employment of false and meretricious details.

The examples of British art manufactures in the Paris Exhibition were also referred to as exemplifying the progress which art culture was making in this country in the design and excellence of execution which the furniture and textile fabrics displayed; by their high standard in these essentials challenging the claim for pre-eminence in artistic productions which has hitherto been allowed without dispute to our Continental friends, and proving that the English were capable of originating, and successfully carrying out, a style peculiarly their own, which it would be difficult indeed to surpass for originality of thought and artistic workmanship.

A strong argument in favour of the artistic use of colour in our rooms was advanced, and in reference to this point, Mr. Bonnar observed, "that it had been put forward as an objection, that in the style spoken of there is an obvious tendency to gloomy effects, which are often mistakenly, if not indeed ignorantly, employed for the purpose of obtaining what is supposed to be pictorial interior treatment. Doubtless the use of colourless mediums may be deemed a safe resource, where there is lacking the knowledge of the correct treatment in combination, of the primary and tertiary tones of colour, and the perception of being competent to apply them with their respective complementary shades, and keeping them in due subjection in their constructive relation and fitness to the subject treated."

"It is only through this knowledge and correct perception that full tones of colour can be brought into true position as an appliance for obtaining richness and harmony, and bestowing a furnished aspect to a room. By this means masses of colour that would, if taken by themselves, promote a feeling of harshness even to crudeness from their incomplete operation, are controlled and moulded, as it were, to lend form and richness which can only be arrived at by strict attention to their ulterior purpose, always, however, having in view the textile and other accessories which go to make up the complement of an appropriately-furnished apartment."

By this means it was argued the taste and ingenuity of both the artist and his client could be displayed, and made to result in a pleasant and harmonious combination of the truest decorative principles, in place of the lately-prevailing tendency to colourless mediums.

The art revival was making steady and sure progress in public estimation, and all true friends of art in this expression of one of its highest functions were urged to do their utmost in promoting its success. The paper was illustrated by coloured drawings.

The Chippenham local board have approved plans and specifications, prepared by their surveyor, for proposed baths.

NOTES FROM EDINBURGH.

THE long and severe winter of 1878-79 has swallowed up the spring. A sprinkling of snow in place of dew on the morning of the 1st gave notice of its intention to "linger in the lap of May;" and though the summer sunshine has come at last, it has to rid us yet of such unpleasant reminders of the past as the North wind and showers of hail. Building operations, after being completely suspended for four months, were resumed about a month ago, mainly in the way of alterations in the streets and resumption of the larger works in progress. A few new villas of the better sort are rising in the southern suburbs, and the demand—if there be any—is for the larger and not the smaller villa of the better kind. The letting season has passed, and great numbers of the latter remain untenanted, and cannot find a purchaser. There is not, however, a complete collapse of building speculation, and one scheme of this kind has been getting notoriety of late by its proposal to convert the finely-wooded demesne of Warriston, or that part of it next Inverleith-row, into a range of lofty tenements and shops. The approach to the city by this thoroughfare has hitherto had much of a country aspect, running between the Botanic Garden ground and nurseries for a great portion of its length. The trees on the Warriston boundary are very fine specimens of their kind, and have long given their grateful shelter to the footpath, and will be sorely missed. It says very little for the taste, and not much for the ingenuity, of the parties concerned in the proposal if they cannot devise a method of utilising the ground without so great a sacrifice. The thoroughfare in Princes-street and the footpath next the gardens are being rapidly completed. The latter is a cement pavement, called granitic, because the concrete of the top is composed of pounded granite of the size of gravel turned out of the stone crusher. This concrete is laid over another bed of cinders and broken brick, also of the size of gravel, and the whole, after being pretty thickly dusted with the pure cement and levelled with the trowel, is rolled with an iron roller leaving minute indentations on the surface. This pavement, a portion of which was laid down before the frost, has stood the severe test of the winter, and promises to be the pavement of the future. It is laid down in sections 12ft. square. There is not much probability of its being injuriously affected by heat or rain—and if this be found to be the case—it will probably surpass in durability the rival Val de Travers. This pavement shows already symptoms of disintegration on the North Bridge footway, and on the side most exposed to the heat. The surface has lost considerably the original level, and great holes are appearing. This result is not to be found in the Leith Kirkgate, where the sun has not access in the same degree. But very possibly the design of the North Bridge has not made allowance for the expansion of its vast amount of metal. In the Waverley Iron Bridge the pavement (which is stone), is raised in very hot weather, and is cracked from end to end, and this may have somewhat to do with the disturbance of the asphalt.

The work of restoration is going on in St. Giles's Collegiate Church, but has not resulted in any interesting architectural discoveries, except indicating the methods adopted by the last restorer to convert the stone pillars and capitals into plaster shams. Dr. W. Chambers, who distinguished himself at a very early period by his antiquarian researches and discoveries in the Old Town, has undertaken the present work of restoring the south transept and its aisles at his own charges; but he has also offered to complete the work, and open up the whole edifice on condition of this offer being accepted by the Council and Presbytery before May, 1880. This involves the vacating of West St. Giles, or the nave, by the congregation now holding possession of it as a church; and it is understood that no obstacle is in the way but the difficulty of raising funds for the erection of another church.

The University Extension buildings begin to make some appearance over the enclosures, and the spire of St. Mary's Cathedral is making rapid progress to completion. It has reached the height of rather more than 200ft., and may possibly be finished at its present rate of progress in less than two months. The library has

been roofed, and the vaulting of the choir is going on. The unfinished condition of the corridor exit at the chapter-house is a great disfigurement, and the sooner this part of the design is proceeded with the better so far as the Melville-street front is concerned.

The nave has been opened for service for some months, and under the most unpropitious circumstances as to weather. The powerful heating apparatus was not always successful, nor could it be with such perpetual frost and the east wind piercing the canvas protection at the tower. The heated air is admitted at a grating on the north side of the west porch, and there is always more or less of a gale in this quarter. The heating apparatus for the choir is separate, and placed in a vaulted chamber beneath the library. The church furniture for clergy and choir is plain and simple as befits the temporary character of the present arrangements. A very fine organ, sweet-toned and powerful, is fitted up under the bay of the north aisle, next the tower, but forms no part of the cathedral organ which is being built.

The accommodation for the congregation is for upwards of 1,000. The chairs are ranged on either side of the centre and aisle passages, and are very much superior, so far as comfort and convenience in kneeling are concerned, to the best pews as usually constructed. They are, however, more prodigal of space than economical arrangements would allow. Seats are free, but a portion reserved for the regular congregation till the bell has rung. In the evening there are none reserved even in this way, and the whole nave is generally filled. The aspect of the interior, being wholly devoid of plaster decoration, and almost entirely, except in doors and roofs, without the usual amount of fixed woodwork, is something so different from church architecture in general, and the vast surface of polished and chiselled stone work, with the rough rubble in the aisles, looks so cold, that one at first almost regrets the absence of plaster and brick, and wood lining. In a little while, however, and the illusion is dispelled, and the most sceptical will allow that his position is as comfortable as it could be in a cushioned, closed, or curtained pew.

The interior is lighted by 12 coronae of 36 lights, suspended from a bracket in the clerestory, one opposite the centre of each of the six arches of the nave. An arm and cluster of lights project from each circular segment of the ring, and all in the neighbourhood of the lights is silver-work and brass of very ornate and elegant design.

The acoustics of the edifice are wonderfully good, considering the absence of most of the conditions considered necessary by parties who are prone to theorise upon the subject. There is no resonant material but only in the roof. The interior is very long in proportion to the breadth of the nave, and very lofty. Taking observations at the western extremity, it will be found that the words of the clergyman reading the service from the north side next the pulpit are most distinctly heard without any echo or disturbing influences to mar the compact utterance of the syllables. The conditions will be greatly altered when the screen has been removed and the choir opened up behind the voices. The varying results produced at present by the various parties officiating in the nave, and their different positions, forces upon one the conviction that a great deal depends upon the speaker and his way of speaking. This much may be said of the cathedral, that its acoustic properties at present are better than those of the other two large interiors of the same size in Edinburgh, viz., the Church of the Jesuit Fathers in Lauriston, and the new Catholic Apostolic Church. Both these buildings have one large auditorium without aisles. In both these is a sanctuary. In the latter, the effect of the reflection of sound from the unbroken surfaces of the walls is very curious at times, and at a little distance from the speaker, when he comes to the front step of the sanctuary to read his homily, the trumpet gives a most uncertain sound, and by accident, if not design, he speaks in what is, to all appearances, an unknown tongue. This unfortunate result is evidently occasioned by the absence of aisle and arching to break up the waves of sound on the reflector; on the other hand, though much further off, the voice of the intoning from the altar is comparatively, though not quite, distinctly heard.

ART FURNITURE.*

MR. A. JONQUET'S "Original Sketches for Art Furniture" in the prevailing styles—the Jacobean, Queen Anne, and the Adams—will be found of service when so much that is bad and indifferent in reproduction is foisted upon a too credulous public as antique. Lately there has been a rush for Jacobean furniture and that purporting to be after Chippendale and the Brothers Adam, and a number of imitations have been produced at high prices, though without any guarantee that they have been honestly constructed. Ordinary buyers know little and care less about the actual design of these articles, which are in most cases utterly bad and inferior imitations, and Mr. Jonquet's book of sketches will be found useful by both classes, the manufacturer and the purchaser, especially in the styles last mentioned. There has been amongst one section of the public a reversion from the heavier style of the Jacobean to the finer and more delicate construction of the Classic revival which was the fashion during the reigns of the earlier Georges, and was promoted by the Adams Brothers and Chippendale, and probably by the taste of the Court of Louis XV. There seems to be a desire to avoid the extremes of the Stuart, and the frivolous ornamentation of the French. In glancing over the book of Mr. Jonquet we notice a few designs of a rather hackneyed character. The first sideboard is faultless in general proportions, and the character of the lower framing good of its kind, but the cove looks very heavy, and it is a feature that is likely to become in the hands of many a little used up. We, however, prefer this treatment to the second example given, where the centre part has upright framing and the cove at the ends gives a somewhat disconnected and broken look. No. 3 is a trifle over-fanciful in the lower panelling. Infinitely better are the small sideboards, and we note especially with commendation plates of 8 and 9. The dinner waggon and couch are exceedingly quiet and chaste. The Chippendale chairs also please us by their extreme simplicity and avoidance of undesirable ornamentation, and the artist appears to have caught the spirit of the original style. Though unique, the chimney-pieces are not so good in the Adams style as they might be, and the author has certainly failed in selecting his models. The sketch showing Wedgwood panels in the last example is unhappy; the arched mouldings under mantelshelf are destructive to the repose of the whole composition, and subverts the architectural meaning. We have seldom seen tasteful or sensible designs for hatstands. The one given, purporting to be in the Queen Anne style, does not strike us as very characteristic, though this we do not complain of so much as a rather purposeless design, and the badly shaped pegs for the hats. The other designs for hall furniture are very nice, and the hall benches especially so, in which the backs and arms are relieved by the simplest scallop or shell pattern. The bookcase in the style of Adams has the fault of being too much ornamented in the cupboard doors. Passing over several other designs for panels, finger-plates, and a pier glass, the latter a weak and rather nondescript suggestion, for one more Japanese in its motif, we come to a variety of designs for cabinets and wall cupboards, some very pleasing and appropriate. The "bric-a-bracs" are suggestive, but the best cabinets, to our taste, are those having a hollow centre in plan, the cupboards forming outside projections with shelves for bric-a-brac, as shown in one of the design. The oval mantels are not so happy. The "Adams mirror" is chaste; and a few very pleasing designs for tables and bedroom furniture in the last style close the work.

Throughout the designs we notice the detail is shirked, the mouldings being drawn with a certain want of precision that is unpleasant. In a book of a suggestive kind like that of Mr. A. Jonquet's this is perhaps not a great fault, yet a little more decision would have made the sketches more welcome. If sketch plans had accompanied some of the designs the book would have possessed more practical value, and we think the author might with advantage have been a little less sparing of litho and descriptive letterpress, of which there is nothing. In the next edition, too, we recommend that the plates be numbered if only for easier reference. With these sugges-

* Original Sketches for Art Furniture, in the Jacobean and other styles. By A. JONQUET. London: B. T. Batsford, 11, High Holborn.

tions we are prepared to recommend Mr. Jonque's sketches to those who prefer the lighter and more modern styles of artistic furniture.

ARCHÆOLOGICAL.

BELCOE.—During the formation of a line of railway between Enniskillen and Sligo, a mound has been dug up on at Belcoe, Co. Fermanagh, which was considered, in accordance with Hibernian custom, to be a trace of Cromwell's battlefields. Last week, however, Mr. Wakeman, the local hon. secretary of the Royal Historical and Archeological Association of Ireland, examined the spot, and pronounced it to be a tumulus of the most primitive type. The central work, which is perfectly circular in plan, measures 125ft. in diameter. Its height is 12ft. 9in. It is further encircled by a fosse and ditch. All over the mound entire skeletons *in situ* and broken portions of the human frame were abundantly found. Amongst the *débris* a quantity of wood charcoal was evident, and flakes of the same material occurred more or less all over the mound to a depth of several feet. Not one article of metal has been found excepting, nearly upon the surface, a silver penny of King John struck in Dublin, exhibiting, as usual, the triangle, star, and crescent, but the sepulchre afforded some specimens of stone globes. Such remains are generally supposed to have been symbols of the sun or moon. The larger measures 19in. in circumference; the smaller is about the size of a musket ball. A small portion of a vessel of hard-baked clay, possibly a food holder, or burial urn, was also found. Some of the skulls had fortunately been preserved. Mr. James Plews, manager of the line, has promised that any further discoveries shall be carefully recorded. The local engineer, Mr. Logan, has also co-operated in the investigation.

A ROMANO-BRITISH TOMB.—A few days since a very remarkable discovery was made on the estate of Mr. George Palmer, M.P., at Eling, in the parish of Hampstead Norris, near Newbury. During the course of excavating for field drainage, the workmen struck upon an arched vault or grave, which has been pronounced by Mr. W. Money, F.S.A., of Newbury, to be a Romano-British sepulchral chamber. The tomb lies north-east and south-west, and gives an inside measurement of 8ft. in length by 2ft. in breadth, the height of the roof from the floor to the ridge being about 4ft. The walls, which are built of rough flint with bonding courses of brick, are 2ft. high, and as perfect as when they were first raised. From the walls spring an arched, peaked roof or cover, formed of the well-known flanged Roman roof tiles overlapping each other, and set in mortar. Within this the internment took place. The floor of the chamber was on a bed of gravel, over which had been spread a layer of clay, and on this appeared to have been cast the remains of a funeral pile, consisting of wood ashes, with fragments of human bones and a few nails, which may have fallen from the tiles above. It is possible that the dead body had been burnt on the spot where it was buried. In clearing out the grave, which unfortunately had been effected before Mr. Money's attention was called to the discovery, a metal ring, now in the possession of Mrs. Palmer and of which no information has yet been obtained, was found. Part of a small sepulchral urn, of a black colour, known as Upchurch ware, was also thrown out of the grave; but no coins or personal ornaments except the ring were noticed, nor has any inscription or impression been observed on any portion of the tiles or other materials. This tomb is in the immediate neighbourhood of a Roman villa which was discovered some years since, but has never been properly explored. It occupies an area of about 60ft. by 45ft. A considerable portion of the walls and the tessellated pavements, of common red brick tesserae, still exist, though much mutilated by the use of the steam plough over the site. Among the ruins can be seen quantities of roofing-tiles and scored paving, stucco or wall plaster, painted or dark-red fragments of pottery, oyster-shells, animal bones, &c. From the fact that the tomb evidently belonged to a person of some rank in society, and that in the country the owner of a villa had his burial-place in his own precincts, it may be fairly conjectured that this grave was occupied by a denizen of the neighbouring dwelling. Another Roman villa was discovered some few years ago on the adjoining estate of Mr.

H. M. Bunbury, of Marlstone House, and, according to Dr. Stukeley, a Roman altar, dedicated to Jupiter, was dug up in the adjacent parish of Frlsham in 1730.

SCHOOLS OF ART.

SHEFFIELD SCHOOL OF ART.—ANNUAL RE-UNION.—Last Friday evening the third reunion of the present and past students of the Sheffield School of Art was held. Mr. M. E. Hadfield, the president, said that of the fine arts he perhaps knew most about architecture. In England architecture was usually divided into three heads—civil, military, and naval. He proposed to say a few words on the first only. The historical part of the subject presented a wide field for research. Whether they ascended the Nile, and contemplated the grand and solemn monuments left by the Egyptians; or whether they visited the wonderful caves of Ellora and Elephanta, and the remains of Hindoo or Assyrian architecture they should at once be stimulated to trace the origin of glorious architecture from its very cradle. He referred to Cleopatra's Needle as attesting the wonderful power of the Egyptians in portraying and recording the history of their country in language perhaps difficult in our day to decipher, but yet as complete and enduring as any record could be. He passed on to Greece—that classic land the inhabitants of which cultivated and excelled in literature and art—and afterwards to Imperial Rome, where they discovered a large and constantly varying development of pure Greek art, wonderful indeed for its colossal grandeur and profusion, but in his judgment lacking the purity and simplicity which lent such a charm to Greek art. Having alluded to Byzantine art, which arose from the ashes of Imperial Rome, he went on to speak of the architecture called Gothic by the superficial and conceited observer. The name was originally given in derision, but he felt that English excellence in art owed very much to the grand old cathedrals and churches, which, great in decay, still told in language not to be mistaken that there were giants in those days. To attain anything like excellence in the practice of Gothic art it was necessary that the student, satchel and sketch-book in hand, should visit the old churches and castles in this land. In his younger days he had spent week after week in this kind of work, and he would much advise students in order to obtain knowledge of the principles of this style of art to follow his example. He did not intend to allude to the architecture of our own time, for diverse opinions, captious criticisms, and vulgar prejudices interfered with a calm review of what had been of late and was now being done. It would be for those who came after to judge if the English architects of the present time had degenerated, or rather if they had made the most of the opportunities presented. He would urge his young friends, whilst not despising any style, to practise none, unless they had at least mastered the rudiments. He cautioned them against being too easily satisfied with what they did. Nothing was so fatal to the real progress of a young and promising student.

COMPETITIONS.

GREENOCK MUNICIPAL BUILDINGS.—The representatives of the Press were permitted to view this collection of competitive plans last week. These are well hung for exhibition in the picture saloon of the Town Hall, and embrace about 50 designs, sent from all parts of the United Kingdom. Among the leading may be mentioned those marked with the mottoes "Argosy," which has elevations well treated in the first style of art, "Hope," "Business," a design of great merit with an admirably arranged plan, "Municipal," and "Renaissance." Many of them are remarkable for their mottoes, as well as for peculiarities in planning and treatment of the elevations. One competitor has been odd enough to adopt a sealing wafer, while another has a diagram of the rising sun. Among those remarkable for peculiarities of plan may be mentioned "Art and Science," which has a large tower close up to the building line of an exceedingly high building presently existing. This design, which is very elaborate, and a few others, would cost double the sum mentioned in the instructions to architects. Several of the competitors show considerable skill in planning, but

very few express the purpose of the building by their elevations. Many of these are highly ornate, and all styles of architecture are represented.

ISWICH.—We believe that Mr. Charles Barry is to receive sixty guineas and his expenses for reporting on the plans for the new post-office. One of the Town Council thought somebody might have been got at a lower figure. The Mayor—whether the wish was father to the thought or not we cannot say—said it was *just possible* the referee might report that none of the plans had complied with the conditions, in which case of course the town would save the fifty guineas premium offered.

RAMSGATE.—At the meeting of the Improvement Commissioners on Tuesday week a letter was read from Mr. W. G. Osborne, a competitor in regard to the designs for the new road, protesting "against the payment of the premiums of 200 and 50 to the makers of the plans placed first and third by the adjudicators," as those plans were not designs. It was resolved to ask for a written report from Mr. Abernethy on the subject of the new road, and his views on certain plans.

SAFFRON WALDEN GRAMMAR SCHOOL.—For the erection of new grammar schools to be erected in Ashdown-road four sets of plans were sent in under mottoes. These have been examined by the governors, who selected one, the author of which subsequently proved to be Mr. Burgess, the architect of the town hall recently erected in Saffron Walden. The adopted plans provide schoolroom and classrooms, with accommodation for 25 boarders and 100 day-scholars, with sick-room and headmaster's dwelling-house. The works will be commenced in the autumn.

PARLIAMENTARY NOTES.

THE METROPOLITAN BRIDGES.—Sir J. Lawrance wished to know on Monday from the Chairman of the Metropolitan Board of Works when the remaining toll bridges over the Thames would be thrown open free to the public. Sir J. McGarel-Hogg said there was no authority for the statement which had appeared in the public prints that five additional bridges would be thrown open on the 17th inst. The second section of five bridges would, however, be opened within three weeks. He could not at present fix the precise day. There were beyond that number three bridges which would remain to be thrown open.

CHIPS.

There are in Ireland no less than 155,675 mud cabins, not one of which contains more than one apartment. These 155,675 cabins are occupied by 227,379 families. There are, however, 357,126 mud cabins of the better class, which afford accommodation for 432,774 families.

The Luton Rural Sanitary Authority have decided to consult Mr. W. R. Phillips, C.E., as to the best means of furnishing a water supply for the village of Stopford, and have authorised a committee to obtain tenders for the execution of the same.

The memorial stone of a new Wesleyan Chapel, was laid at Stechford last week. The chapel will be a red-brick structure, with stone facings, and will seat about 350 persons. The architect is Mr. George Ingall, and the builder, Mr. Lee, of Ashton-road, Birmingham. The cost will be about £1,500.

The south aisle and porch of the parish church of Uleby, Lincolnshire, have been rebuilt under the direction of Mr. James Fowler, architect, of Louth. Messrs. Potts and Blanchard, were the builders.

The village of Whiteabbey, Belfast, has been practically rebuilt by Messrs. J. Lowry and Sons, under the direction of Mr. John Lanyon, architect for the Whiteabbey Spinning Co., whose works are adjacent.

New baths and washhouses have just been erected at Belfast. The plans were prepared by Mr. William Hastings, architect, Mr. W. B. McMaster being the builder. The buildings are of brick, with stone dressings and terra-cotta bands. The structure will cost about £4,000.

An exhibition of gas apparatus similar to those which have recently been held in Leeds, Bradford, Halifax, and other places, was formally opened on Monday in the saloon of the Corn Exchange, Wakefield.

At Poulton-le-Sands on Thursday afternoon in last week, William Harper, contractor, of Liverpool, committed suicide by hanging whilst in an unsound state of mind.

Building Intelligence.

ARNOLD (NEAR NOTTINGHAM) CEMETERY CHAPEL.—A lodge and entrance gates have just been completed at above village. The chapels are attached with a tower and spire, vestries, and porches. The lodge is a one-story building, with board room. The entrance gates have stone pillars and wrought-iron gates. The roofs of the chapels are open-timbered, covered with tiles. All the buildings are of Bulwell stone, with Bath stone dressings. The spire is 90ft. high. The works were executed by Mr. William Shipstone, of Nottingham, at a cost of £1,893, from the designs and under the superintendence of Mr. Robert C. Clarke, architect, Journal Chambers, Nottingham.

BREWOOD.—The Parish Church of St. Mary the Virgin was reopened on Tuesday week after restoration. The work has included the entire rebuilding of the south arcade, the thorough renovation of the chancel (only the side walls of which have been left standing), the re-flooring of chancel, nave, and aisles, and the re-roofing of the whole of the church with Memel timber. The east end wall—formerly of brick, with an ugly, unsuitable window—has been altogether rebuilt of stone, and the window is filled in with stained glass representing scenes in the life of our Lord. The north aisle has as yet been left comparatively untouched, and a considerable amount of alteration is required. The complete restoration was estimated to cost about £6,600, and of this sum the work already accomplished will amount to something like £5,400. Mr. G. E. Street, R.A., of London, has been the architect, and the contract was intrusted to Mr. H. Lovatt, of Wolverhampton.

CHANCERY LANE.—Mr. T. Searancke Archer, A.R.I.B.A., of 2, Gresham Buildings, E.C., is the architect of a Renaissance block of offices just erected at the corner of Chancery-lane and Southampton Buildings. The materials used in construction are red Suffolk brick, Portland and Box Ground stone, and the roof is covered with Eureka green slating. It is fitted up internally with specially designed wooden chimney pieces and Barnard's stoves, and ornamental lead lights have been used in all upper sashes over the segmental bars, and in panels of entrance doors and in transom. Advantage has been taken of the cellars under roadway to construct a number of fireproof strong rooms for the use of tenants. The builders were Messrs. Lloyd, and the carving was executed by Mr. Hearn.

CHESTER.—On Sunday a new altar dedicated to St. Joseph, was opened by the Bishop of Arundale in St. Francis' Catholic Church, Chester. It has been designed and made by Mr. John A. Hanley, of Grosvenor-road, Chester. The altar, which is of Storeton stone, is supported on red marble shafts and carved capitals. The central feature, and forming the altar-piece, is a statue of St. Joseph, on a carved pedestal, under a rich octagonal canopy supported on marble shafts, on either side of which are panels of delicate carvings, viz., the oak, lily, rose, and pomegranate, each having a typical reference to the Saint. A boldly-carved cornice terminates the altar; the general effect of the whole is heightened by the introduction of numerous marble shafts, and inlays of red and green colour.

CREWE.—The new Manchester and Liverpool District Bank, Crewe, was opened on Saturday week. It is partly in the Gothic and Elizabethan styles of architecture—a half-timber design peculiar to Cheshire, having gables and dormers. The upper portion of the building is of ornamental brick, mixed with woodwork. The building is chiefly of bricks with dressings of Alderley stone, and the roofs are covered with red tiles. The contractor is Mr. A. P. Cotterill, of Crewe; Mr. Beattie has been clerk of the works; Messrs. Barker and Ellis, of Manchester, are the architects. The cost of the building is between £4,000 and £5,000.

DERBY.—The new Free Library at Derby is completed. The cost has been over £15,000. Messrs. Woods, of Bolton, have been the contractors, and Messrs. Freeman and Naylor, also of Bolton, the architects. The design is Queen Anne, carried out in red brick with stone facings. The curator's house, built in harmony with the large building, is placed on the left-hand side of

the library. The libraries are placed in the centre of the building, and inclosed on two sides by a screen of stained glass. The libraries are lighted from the roof. The second floor gives access to the Sculpture Gallery. The Museum itself runs right round this second floor. The basement of the building includes the curator's workshops, together with the Library of Patent Specifications, the assistants' retiring-room, the binders' workrooms, and three storerooms.

DITTON.—The new Roman Catholic Church of St. Michael, Ditton, was opened on Thursday week. The building has been a very costly one, the total amount expended on its construction being between £17,000 and £20,000. The external walls consist of red local sandstone. Internally the material employed is chiefly French white stone. The length of the church from the sanctuary to the door is 120ft.; width of the transept 80ft., and width of the nave and aisle 60ft. The roof, which is of oak, is 60ft. high, while the height of the church in those parts where the oak roof stops short is 40ft. The oak roof is oval-shaped, and in its present plain and unembellished state naturally does not add to the appearance of the edifice. The style adopted throughout the building is Early Norman. The architect was Mr. Clutton, Burlington-street, London, the builder, Mr. Kimberley, of Oxford.

GOOLE.—The Goole Local Board have accepted the tender of Mr. Richard Elliott for the forming, making, metalling, channelling, draining, &c., of five new streets in Old Goole. The tenders were as follows:—Marsh, £1,545; Elliott, £1,550; Wilson, £1,995; Sherman, £2,215; the chief reason of Mr. Elliott's tender being accepted was understood to be that Mr. Elliott being a resident would employ the labour of the locality. The plans, specifications, scheme of drainage, &c., have been prepared by Mr. E. C. Buchanan Tudor, engineer and surveyor to the board, and under whose superintendence they will be carried out. At the last meeting of the board on the 6th inst., Mr. Tudor was requested to design a scheme of sewerage for Pasture and Marshfield-streets in New Goole.

KILBURN.—The new Roman Catholic Church of the Sacred Heart, Quex-road, Kilburn, was opened on Thursday week. The style is Early Decorated, and when completed the building will contain nave and aisles 90ft. by 51; chancel 45ft. by 33; north and south transepts 24ft. by 16; two chapels 25ft. by 12; a tower 16ft. square and 140ft. high. Four bays of the nave are now completed. The height of the church from floor to apex is 61ft. There is a gallery which occupies the first bay of the nave, and which is approached by a stone staircase corbelled out from the buttress at the west end. The materials are yellow malms, with Bath stone dressings. The nave arcade is supported by polished Bessbrook granite columns, with Portland stone capitals and bases. The roof, which is open to the apex, is open-timbered of pitch-pine, and covered with slates. The actual cost of the present portion of the church is £6,000, but the total sum required for its completion will be about £8,000. The architects are Messrs. Pugin, Ashlin, and Pugin. The works have been carried out by Messrs. Merrett and Ashby, of London Wall; the metal work being supplied by Messrs. Hardman.

METROPOLITAN BOARD OF WORKS.—At this board on Friday it was agreed to have a conference with the City Commissioners of Sewers with regard to the Metropolitan and Metropolitan District Railway Company's Bill for City lines and extensions. Amongst the dangerous structures to which works were ordered to be done by the board's contractors, Messrs. J. and J. Greenwood, was St. George the Martyr Church, Southwark. A letter was received from the Royal Institute of British Architects, stating that the council had granted certificates of competency to perform the duties of district surveyors to Messrs. P. Hunter, J. W. James, G. A. Lean, and A. T. Taylor. To the Works Committee was referred a communication from the Society for the Protection of Ancient Buildings, expressing their regret at the decision of the board to raise and open up the York Water Gate, setting forth their reasons why the gate should be preserved in its present position, and stating what works would, in their opinion, be desirable to carry out in connection with it.

OLNEY.—The corner-stone of the Cowper

Memorial Congregational Church, Olney, was laid on Friday. The style adopted is Thirteenth Century Gothic. In plan the church is rectangular, measuring 65ft. long by 38ft. broad. It consists of a nave and side aisles, with a clerestoried roof, which is carried by lofty stone piers at each side of the pulpit, and by iron columns in the nave. Provision is made for seating 328 in the ground floor, and 122 in an end gallery. The work will be carried out in a local limestone, with Bath stone dressings. The roofs will be slated, and the interior of the building plastered. The contract cost of the work is £2,129, the architect being Mr. John Sulman, A.R.I.B.A., Furnival's Inn, Holborn, London.

OSMASTON.—The picturesque little church of St. James, Osmaston-by-Derby, was reopened by the Lord Bishop of the Diocese, on Thursday last, after thorough restoration, from the designs of Mr. Frederic Augustus Devey, of York, by the builders, Messrs. Bullock and Barton, Melbourne, Derby. The flat ceilings of the nave and chancel have given place to open-timber roofs of pitch-pine. A new vestry is provided, chancel and other arches constructed, and arches which were found built up have been opened; four new windows, built in new positions, and filled in with memorial stained glass. The interior of the chancel walls has been faced with alabaster. The floor has been relaid with encaustic tile paving, and the old seats have been removed, and open sittings of pitch-pine substituted; a stone pulpit and open lectern, presented, and much is added to the pleasing appearance of this church by the very chaste altar cloth and fittings which are designed and worked by Mrs. Ussher, who is one of the principal contributors to the restoration.

THE LEYS SCHOOLS, CAMBRIDGE.—The new dining-hall and temporary dormitories in connection with the scheme are now complete, and the north block of houses which will form part of the permanent scheme (and which is one of three blocks forming a quadrangle) is progressing rapidly. The dining-hall is intended to accommodate 350 students. It is built of red brick with Ketton and Corsham stone dressings. It is Early Perpendicular in character, and the fine open-timbered roof is filled in with traceried spandrels. The north block of houses is intended to accommodate eighty students, besides masters' rooms, sick-rooms, visitors' rooms, bath-room, housekeeper's rooms, lavatories, &c.; the same character is of course observed in this as in the dining-hall. The total cost of the whole of the above, including temporary dormitories, is nearly £16,000. The architect is Mr. Robert Curwen, 23, South Castle-street, Liverpool; the clerk of works Mr. George Dalton; the builders have been: Mr. J. Denson, Cambridge, for dining, &c., and Messrs. Pattinson, of Sleaford, for the north block. The cost of the complete scheme is to be about £48,000.

TRURO CATHEDRAL.—A meeting of the general committee of the Truro Cathedral Fund was held in the Bishop's Library, Truro, on Tuesday. The principal business was to inspect the plans of Mr. J. L. Pearson for the proposed cathedral. The style is that of the early part of the Thirteenth Century, and there are to be a central and two western towers. The length from east to west is about 300ft. For the choir 115ft. is allowed, and for the nave 165ft. Mr. Pearson estimated the cost at £95,000, which, with £10,000 required for purchase of land, &c., gives a total to be raised of £105,000. The plans, which were in an unfinished state, owing to the illness of Mr. Pearson, were referred to the executive committee to examine and report upon to the general committee.

WATERBEACH, CAMBRIDGESHIRE.—The parish church of St. John the Evangelist, Waterbeach, was reopened last week, after having been restored at a cost of £3,000. The church was originally of the Early English style, but it was almost rebuilt during the Early Perpendicular period, and the north aisle and porch, the vestry, and organ-chamber just added have been designed in the latter style. The tower has been carefully restored. The new aisle is seated with oak benches, and the windows have been filled with richly-painted quarries. The whole of the floors of the church have been laid to an elaborate design in tiles, by Messrs. Maw and Co. A new reredos is placed at the east end of the church. It is constructed of richly-veined alabaster, and

is surmounted by a carved cross in which a jewel is inlaid. The arreading of the reredos stands upon shafts of Irish green marble, filled in with figures in Opus Sectile mosaic, representing, on the south side, David, Aaron, and Elijah, and on the north side, John the Baptist, Peter, and Paul. The caps of the shafts are of alabaster, richly carved. In the super-altar are three figures in mosaic, with gold background; the centre one represents the Lord seated in glory, and on either side are the Evangelist St. John and Mary Magdalene in adoration. A new oak Communion-table has been carved by Messrs. Rattle and Kett, of Cambridge; it is chiefly composed of cut tracery oak panels from the old screen, rearranged and framed; upon it has been placed an old Purbeck marble slab, which was found in pieces in the church, part being buried under a Tudor floor in the sacarium. New sedilia, piscina, and credence of alabaster have been placed in the chancel, and a new sacarium floor laid down, formed of polished black and white marble, with solid marble steps. The new pulpit is of alabaster and coloured marbles, with figures of Elijah and John the Baptist in niches. The works have been carried out under the direction of Mr. J. Ladds, of Bedford-row, London, by the contractors, Messrs. Warboys, of Basingbourne, and W. Whitehead, of Royston. The carving has been carried out by Mr. E. Whitehead, of Clapham, S.W., the mosaic by Messrs. Powell and Son, of Whitefriars, London, the glazing by Mr. Holmes, of Robert-street, Grosvenor-square, and the brass standards, locks, and wrought-iron hinges by Messrs. Richardson, Ellison and Co., of Holborn. The Creed, Lord's Prayer, and Commandments, are executed in tiles, designed and hand-painted by Mr. Constable, of Cambridge.

WATH-UPON-DEARNE.—A new Roman Catholic church, dedicated to St. Joseph, at Wath-upon-Deerne, was opened on the 1st inst. The design of the church has been studied from the old churches of the district erected at the close of the Fifteenth Century, and is of the Late Rectilinear period. A flèche or spirelet of stone marks the division between nave and chancel, and rises to a height of 70ft., and in it are hung two bells. A porch, with a niche and figure of St. Joseph, holding in his arms the Infant Saviour, is a feature of the front. The interior consists of a nave 61ft. by 24ft., and a chancel 24ft. long, with an organ chamber placed on the north side. The chancel arch affords a view of the eastern window of five lights, containing in the centre the Crucifixion, with figures of the Blessed Virgin and St. John, the remaining four lights containing figures of St. Augustine, St. John of Beverley, St. Ann, and St. Mary Magdalen. The glass is, with the two side windows, from the firm of Lavers, Barraud, and Westlake. There is a pavement of Goodwin's encaustic tiles in the chancel, and the floor of the nave is laid with blue and red Staffordshire quarries. The architects were Messrs. Hadfield and Son, of Sheffield.

An inquiry was held at the Town Hall, Hove, on Thursday in last week, before Col. Ponsonby Cox, Inspector to the Local Government Board, with reference to the proposed borrowing of £30,000, for the erection of a new Town Hall, at Hove; and an additional £550 for sewerage works. Considerable opposition was raised to the former proposal, on the ground that the present building is large enough for municipal purposes, and that the proposed expenditure of £3,500 on a Town Hall, for a population of 17,000 was extravagant.

The parish church of Stockton, Wilts, is in course of enlargement and restoration. The works going forward include the removal of an unsightly gallery, the strengthening of the tower, taking down east wall of south aisle, and part of south wall of chancel, to allow of the erection of organ-chamber, enlargement of north aisle, addition of vestry, and the repairing, re-seating, and warming of the church. The estimated cost is £1,900.

After being in hand over five years, the Bristol and Portishead Docks, constructed at the cost of £280,000, on the Somersetshire side of the mouth of the Avon at Bristol, have been completed, and water has been let in to the depth of 22ft. The total depth will be from 25ft. to 30ft. The main dock is 1,800ft. long by 500ft. wide.

The Vestry of Bermondsey decided, on Monday week, to purchase land in Tranton-road, Blue Anchor-road, upon which to erect a vestry-hall, public hall, library, and stoneyard.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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RECEIVED.—C. and Co.—F. G. M.—D. R.—M. Bros. and Co.—D. R. R.—W. and Co.—H. R. S. A.—B. of A.—C. M.—L. T.

W. G. O. (It is scarcely necessary to say that reviews of competition designs are never written by interested persons.)—R. T. P. (Any respectable patent agent will search for you.)

"BUILDING NEWS" DESIGNING CLUB.

"POORHOOD." (This design came too late; the plan is suitable, but the entrances and seating are defective.) In the designs for chimney corner we have received a very good design under "Motto J.," but it was received too late for our review.

Correspondence.

IPSWICH POST-OFFICE COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—The treatment to which architects are continually subject at the hands of building committees is, of course, only too well known; indeed, comments on the subject have almost developed into mere truisms, whose insipidity results from one's habitual familiarity with the fact. There is, however, a freshness about the instances as they occur in "the old, old tale," especially when the discussions and proposals of competition committees are made known. Each seems to vie with the other in unfair and unbusiness-like proposals, such as the members individually would of course repudiate at once in their own commercial dealings as unworthy of consideration. That such proposals are made in ignorance cannot be allowed while the principles of morality are worth naming, and, indeed, no one not devoid of common sense would ever think of treating lawyers or any other body of professional men in the way in which architects are dealt with. The instance of this sort of thing to which I would draw your attention is recorded in last Saturday's *Southfolk Chronicle*, where the discussion of the Town Council of Ipswich on the election of a professional referee is given in full. Fortunately, by a majority of 12 to 7, the competitors have escaped the iniquitous proposal of Mr. W. Fraser, who said that the architects engaged in the competition would willingly forego any premium if the Council determined to consult the President of

the R.I.B.A., Mr. Charles Barry, with reference to its award. So that, according to this successful cloth-merchant of Ipswich, the premium of 50 guineas offered by the Council for the best design would be economically blended into the probable fee of one hundred guineas, to be paid to the referee for his services in helping them to arrive at a decision. Sixty guineas, with ten guineas a day expenses, said the Mayor, who had been in communication with Mr. Barry, would be the terms for adjudicating upon the plans. Thus one hundred pounds would be paid to award fifty, which sum was to return to those who gave it, while the twenty-two architects, who together have spent about six hundred and sixty pounds in preparing their designs, would simply have the satisfaction secured to them by the original condition, that no guarantee is given that the selected design will be executed, at any rate, under the supervision of its author, although, mark you, in the words of the Ipswich "Conditions for architects," "The whole of the designs, reports, drawings, specifications, &c., are to become the property of the Corporation." Oh you cloth-merchants, butchers, bakers, tailors and tinkers of Ipswich, where is your sense of justice? These twenty-two architects have responded to some offer made them, "not wisely, but too well." Foolish they may be to spend so much to gain so little; but surely, in all common fairness, let them be treated with something like justice, and as Mr. Barry has been elected to report upon the plans, let us hope that the most suitable design will be selected, though few, probably, who hear the above particulars can readily believe that it will. I am not a competitor, but

AN OLD T. SQUARE.

THE RAMSGATE NEW ROAD COMPETITION.

SIR,—As yours is the only journal that has taken the trouble to make any notes on the plans submitted in competition for the Ramsgate new road, I address myself to you to show by one more example what professional men must expect if they are so unwise as to be competitors for public work in open competitions.

The conditions issued by the commissioners were drawn up by a well-known London engineer in conjunction with the town clerk. They were fair, explicit, and still more, showed what was passing in the minds of the commissioners at the time the conditions were issued. Most of the plans submitted have, I believe, complied with the conditions, excepting those which follow a similar line to that which Mr. Abernethy has considered of such merit as to have earned the first premium. The expressed intention of the commissioners was that they had determined the new road should be kept as much as possible to the front, and of such importance did they consider this that they went out of their way to state that the Custom-house and pier stores could be acquired from the Board of Trade without difficulty. Here was the clear direction of the promoters. Mark the award of their professional assessor! The first premium is given to the plan of all others that keeps in the background, and comes no more to the front than can possibly be helped. I have no desire to say we work against Mr. Abernethy—as an engineer; but he is human, and errs, like most other human beings; he has erred before, if we are to believe the Ramsgate people, on a matter of sewerage connected with the sea outfall; he has erred for a second time, and done a gross injustice to those gentlemen who have stood by the conditions laid down by Mr. Abernethy's employers. The plan this gentleman has chosen, if executed, would further a pet scheme for a railway from Ramsgate to Deal, in which he avows he has a personal interest. Plainly then, is it honest and fair to employ a gentleman who has a grain of interest in the locality in future engineering schemes—as an arbitrator? I believe the commissioners were desirous of employing some one who would give a just award.

I have not seen the designs, and therefore may be incompetent to criticise them, which I do not desire, but if the printed description of the first premiated plan is correct, it is nothing more or less than that designed by Mr. Ellise Clark seven years ago, a cartoon of which hung for years in the Town Hall; a plan made anterior to Mr. Abernethy's pet railway deposit, and follows, with a few alterations, a route that would enable the latter gentleman's railway to be carried underneath. It would appear that

the assessor made the new road subservient to his Parliamentary plans, as near as could be, never hinted at in the conditions, and he ignored the expressed intentions of the Commissioners.

Let us hope the Ramsgate authorities have wisdom enough to set aside the award of this interested gentleman, and that they will carry out a scheme giving that which they advertised for—a marine drive connecting the cliffs and town.—I am, &c.,

AN ENGINEER WHO DID NOT COMPETE.
London, S.W., May 10, 1879.

LISKEARD SCHOOL BOARD COMPETITION.

SIR,—Will you kindly insert the inclosed letter from the *Western Morning News* in your next issue? I am as well add that the successful competitor has agreed to carry out these schools, and also others for eighty children for £20, instead of his 5 per cent. commission; and before accepting his design the Board wrote and asked him if he had included boundary-walls in his estimate; he wrote and said "Yes." In the competition specification *Aberthaw line* was specified, but on the ones given to builders to tender from *common line* was substituted. When such things are done by professional men, we may well despair of ever having competitions on a fair footing.—I am, &c., A COMPETITOR.

[COPY.]

"LISKEARD SCHOOL BOARD."

"SIR,—Architects having been invited to submit plans and specifications, with estimates of cost of erection and completion, for a school and master's residence at Trewidland, including boundary walls, the Board received plans, &c., from the following gentlemen, viz.:—Mr. Vincent, estimated cost, £909; Mr. Elliott, £850; Mr. Wise, £850; Mr. Treval, £750; Mr. Clifton, £638; Mr. Skentlebury, £500, and decided on adopting Mr. Skentlebury's plans, &c., on the ground of cheapness, after being assured by that gentleman that the work could be carried out for the sum named by him—£500—and that the price was not founded on his own opinion only, but that he had consulted a builder in the matter also.

"In response to an advertisement several tenders for the work were received, the lowest, that of Mr. Whale, of Altermum, being accepted—£504—being in advance of the architect's estimate £94. The next lowest tender was that of Mr. Trehan, of Liskeard, £700, or £200 in advance of the architect's price. The Board met on Tuesday last to make the necessary arrangements with the contractor, when that gentleman asked to be allowed to alter his price to £659 on the ground that he had omitted the boundary walls in his first tender. A discussion ensued as to whether it would not be advisable to throw overboard Mr. Whale's tender and accept the next lowest. It was, however, ultimately decided to add £65 to Mr. Whale's tender and allow him to do the work. A large number of ratepayers feel aggrieved at the course adopted by the Board for the following reasons, viz.:—

"1. Mr. Skentlebury's plans having been selected, on the ground of cheapness—£500 for the entire work—that gentleman ought to have been called upon to carry out the same, in fairness to other architects, or his plans thrown overboard.

"2. Mr. Whale's tender being also accepted on the same grounds, he should have been called upon to carry out the work at the price first named, or to give it up.

"3. They can have little confidence in the satisfactory completion of the work after so much evidence of bungling on the part of the principals.

"A gentleman who was absent from the meeting when this important business was put to the vote is anxiously inquired for.—Yours truly,

"A RATEPAYER."

CHURCH RESTORATION IN THE TIME OF GEORGE THE FOURTH.

SIR,—The following cutting, clipped from an Exeter newspaper, under date of October 6, 1825, is interesting, in that it has reference to church restoration of that date:—

"The roof of the parish church of St. Stephen in this city being much out of repair, the parishioners have, with laudable zeal, determined to take the opportunity for remodelling and beautifying the interior, by which it will be rendered light and airy, as well as more commodious than at present. The old roof is to come down entirely, and to give place to two rows of light pillars and arches, dividing the church into a centre and two side aisles; the effect of the whole will be to render it one of the handsomest parish churches in the city. The

present building was erected on the site of the old church in 1664, with the exception of the tower, which received some additions to the upper part a few years since, but is otherwise most probably coeval with the original building."

St. Stephen's is situated in the High-street, and is known locally (on account of a small street running at right angles to the main thoroughfare, going directly under the chancel) as St. Stephen's Bow. Its exterior continues to be "restored" every few years by receiving a good coat of paint, equally put on from wall-plate to plinth. Indeed, curious to record, whilst so many of our outlying Devonshire churches have their requirements carefully and lovingly attended to, the reverse is the case with the score or so of old ones to be found in the "ever-faithful" city. These, with one or two notable exceptions, rarely receive more attention than a bucketful of whitewash is capable of bestowing.—I am, &c., HARRY HEMS.

Exeter, May 12, 1879.

CARLIOL TOWER, NEWCASTLE.

SIR,—Whatever it may be to the ratepayers of Newcastle, I am inclined to think that the "washing out" of any portion of the "dirty linen" from the Borough Engineer's Office, will be but of little interest to the general body of your readers. For this reason I will not presume to occupy your valuable space by going over the whole of the controversy raised by the proposed destruction of the Carloli Tower or Weavers' Hall. But, perhaps, I may be allowed to say that, having had an opportunity of reading the reports of the Government Inquiry, published in the Newcastle papers, I find that those reports, to all intents and purposes, coincide with your own. Mr. Fowler quietly accepts the reports published in his own district, where all the details of the controversy are well known; but, taking advantage of the fact that the vast majority of your readers are totally unacquainted with the subject, he thrusts upon us the tittle-tattle of a petty quibble between Mr. Oliver and himself. In following this course of action, Mr. A. M. Fowler exercises a very wise discretion. He puts himself to a great deal of unnecessary trouble in pointing out with much minuteness a mistake in Mr. Oliver's sketches as to the proper position of the Carloli Tower. I say unnecessary trouble, because this self-same mistake was pointed out in the public press eight or nine months ago, and acknowledged also in the press by Mr. Oliver at the same time. It was again pointed out by Mr. Oliver himself at the Government Inquiry, and he explained, at the same time, how it could be overcome. This error, then, having been pointed out and explained again and again to the public during the last nine months, Mr. Fowler in the "rich plenitude of his generosity," again kindly explains for the edification of your readers, and upon the strength of this somewhat mistaken act of kindness, and in defiance of all the rules of English grammar, he asks us to pass an opinion as to whether such "grave errors can be considered clerical?" Mr. Fowler lays himself open to a personal retort, of which I will not take any advantage; but I leave it to those inhabitants of Newcastle, who, from their knowledge of this matter, are best able to judge, to say whether Mr. Fowler is thus justified in throwing dust into the eyes of the public, and blinding them to the merits of the real question at issue, viz., whether Mr. Fowler and the Town Council shall or shall not be permitted, without the shadow of a shade of reason, to ruthlessly destroy one of the most interesting features of the Northern metropolis.—I am, &c., AN OLD NOVOCASTRIAN.

MR. STATHAM'S ROYAL INSTITUTION LECTURES.

SIR,—I am reading with great interest these excellent lectures; but I am sorry to say that I have come across one or two stumbling-blocks. For instance, Mr. Statham says, "the Corinthian order is more correctly regarded as a Roman than as a Greek order, for it was but rarely used by Greek architects;" but, he says again, "On comparing the order as developed in Rome with that of Greece, a very important difference was apparent, and one which in principle distinguished the art of the two nations in every feature"—showing that the Greek Corinthian had at least so much individuality that it "very im-

portantly differed" from the Roman. I have always understood that the Corinthian of the Choragic Monument of Lysierates is as thoroughly Greek as is the Doric of the Parthenon. Again, in speaking of the Ionic order, Mr. Statham says, "in Greece Ionic columns were only employed between pilasters," and that "the Romans used the Ionic columns at angles, and without pilasters, the consequence being that the volutes did not present an agreeable appearance when viewed sideways." I have hitherto been under the impression that this same disagreeable appearance when viewed sideways was to be found in one of the Greek Ionic temples grouped upon the Acropolis of Athens.

If I am in error, perhaps Mr. Statham, or some other authority, may do me the kindness to put me right.—I am, &c.,

A PROVINCIAL PRACTITIONER.

Intercommunication.

QUESTIONS.

[5763].—**Wood Pavement.**—Will any of my fellow-readers kindly inform me of the best way to lay a wood pavement for ordinary traffic?—K.

[5764].—**Sizes of Rooms on Plans.**—I should be glad of the opinion of some practical correspondent on the following point:—Are the sizes of rooms figured on plans to be considered as meaning when the plaster is on and the rooms finished, or from the wall or brickwork itself? The proprietor says the former.—SET SQUARE.

[5765].—**Art Exhibition at Swansea.**—Can any reader give any further particulars respecting the Art Exhibition at Swansea, to be held, according to a "chip" on p. 505 in your last issue, in October next? I fancy the announcement is a mistake. I know the Church Congress this year was to have been held at Swansea, but I believe it has been decided not to go there. I have not heard of any other exhibition.—WOLFE EXHIBITOR.

[5766].—**Purification of Sewage.**—I will be glad if one or more of your experienced correspondents would give me particulars of all that is required to be done in order to secure the sewage of a village (inland) being rendered pure before being let into the village stream, and such as will meet the requirements of the "Rivers Pollution Act, 1875." The population is 8,000, and the locality a poor one. It is desirable, of course, to have the arrangements as simple as can be commensurate with a rendering of the sewage harmless to the stream.—LOCAL SURVEYOR.

[5767].—**Purpose-Made Bricks.**—Will one of your readers give me some information as to the precise object gained by the use of bricks purposely made for the erection of a building? I noticed in the description given last week in the *BUILDING NEWS* of the new Divinity Schools at Cambridge, that bricks had been made to work four courses in gins, and I think purpose-made bricks have been used by Mr. Street in the New Law Courts. Is the expense of building much increased by this practice?—L. T. W.

[5768].—**Mechanics.**—Will some obliging reader inform me of the simplest rudimentary work known on mechanics applied to building construction, and also a simple work on the science of Gothic vaulting?—LIONEL.

[5769].—**Marble.**—I have got a lot of marble which I want cut into pieces and polished. Any information regarding the above would much oblige.—AMATEUR.

REPLIES.

[5716].—**Imperial Hotel, Torquay.**—This hotel, one of the finest and perhaps the very best situated places of the sort in the West of England, was built in two sections. It has a frontage of 120ft., by 90ft. deep. I forget the architect's name, but the second half was built by Mr. James Matcham, of The Crescent, Plymouth, who I am sure would be glad to give "J. A. C." any further particulars he may wish to know.—HARRY HEMS.

[5724].—**Queen Anne Buildings.**—Mr. H. Barnes will find by reference to back numbers of the *BUILDING NEWS* that most of the best examples of this class of work have been illustrated therein within the last four or five years.—HARRY HEMS.

[5728].—**Coloured Building Stone.**—Having given much attention to building stone for many years, I have naturally felt some interest in the correspondence upon this subject which has appeared in your columns, and I regret not to find in your last edition a distinct answer to "J. W.'s" question of the 2nd inst., prefaced as it is by such high commendation of the "Hand in Hand." The general impression has been that the stone in question is "Corsehill," and I was myself so struck with the effective appearance of the stone that I directed the attention of an architect to it, who has since used "Corsehill" for some mansions which he has erected in Cromwell-road, Kensington, and which, I think, equally deserve to be commended, the stone in the latter work carrying as fine an air, and holding its colour equally as well as that in the first-named building. There cannot be a doubt Mr. Trickett is able to inform your readers where the stone really comes from and what its real name is, and I trust he will do so. In my turn should also be glad to know what the stone is at Gloucester-road bridge.—G. F.

[5728].—**Coloured Building Stone.**—I have noticed that for some weeks past a correspondence has been kept up with reference to coloured building stone, and that "G. H. G." in alluding in his last week's communication to the red Mansfield stone used at St. Pancras Hotel, states that the darkest variety of this stone has shown itself to be the most durable. I suspect that "G. H. G." knowing that red Mansfield stone was rather

extensively used in this building, has taken it for granted that all the red stone that is therein to be seen came from Mansfield, whereas the fact is that several sorts were used, the darkest and most durable of all coming from Duffries and neighbourhood. As the execution of the whole of the works involved in the erection of the building in question was under my personal supervision, I frequently had occasion to visit quarries and examine the respective qualities of the different stones, and in the case of red Mansfield avoided selecting the darker variety, as I knew, from many years' experience, its inferiority in point of durability.—JOHN SAVILLE.

[5740].—**English, French, and German Architectural Dictionary.**—As "Corvus" has had no reply to his question, perhaps it may be of some use to him to know that a vocabulary of architectural terms in 8 different languages was published in two numbers of the *Builder* for April, 1864, originally compiled, I believe, by the Board of Works.—W. J. N.

[5745].—**Wood Roofs.**—In my last reply the figures "295" and "294" and the consequent 42in. must have been inadvertently mistranscribed from my calculation paper, but the right number, 324, gives 5in. in the place of 43, and then by reducing the allowance for notching, &c., to 4in. \times 1in., we obtain the same scantling as before, viz., 6in. \times 4in. I had, I believe, originally obtained 6 \times 4 on the scribbling paper, and hence the reason the mistake escaped me. "Nil Desperandum" asks me to give detailed workings for the various parts, assuming certain strains to be on those parts. In my first letter I asserted that with respect to the timbers in tension the usual scantling is so very much in excess of the sufficient strength of the timber that calculating according to the strain in tension is of no moment, because if we were so to reduce them they would then otherwise be too weak, and I enumerated several contingencies in support of this, and it should be recollected that tie-beams frequently are made to perform heavy duties, and rough usage from possible falling of pieces of timber, &c., quite enough to break them or split them if weak, during the progress of the works. With respect to the principal rafters, even those are made much in excess of the strain that is on them, because if both the purlin and the principal rafter be notched the double notching so locks them together that the rafters are practically confined on both sides and underneath by the strut and on the top will be the pressure of the roof covering, and so practically the principal rafters also require to be considered as requiring substance in scantling, principally for the purpose of solidity and to provide against unexpected defects in the timber and which so frequently exist, notwithstanding all efforts to insure timber free from knots. The formula $W = 20 \frac{b^3}{l^3}$ is derived as follows:— W is equal to the safe load in cwt. or otherwise the load which will really resolve itself in a line with the axis of the principal rafter = W , and is just equal to the resolution of the weight of the roof timbers and covering. Now near enough for practice in ordinary cases half the weight of roof and covering will be on the walls, and the remaining half will be in compression on the principal rafters; but the resolution of forces may be said to double this half, hence the whole weight of the roof may be considered as the resolved pressure on the two principals, hence half the weight of the whole roof taken both sides of ridge will be the resolved pressure on the end of one principal rafter, and if we assume the trusses 10ft. apart, and the roof and covering to weigh half a ton per square, we shall have, say, 1cwt. per foot lineal of common rafter as the resolved pressure on the principal rafter underneath, then the constant 20 is equal to the assumed crushing load on an inch cube of fir, then $\frac{b^3}{l^3}$. Now for the

present let us consider that the whole of the above are in inches, then if the strength of timber in compression were to increase only as its length, and if b were = l we should have $\frac{b^3}{l^3}$, varying as the weight, when l increased b , also l would increase in the same ratio, and which would also give us $\frac{b^3}{l^3}$, as since $b = l$ also must $b^3 = l^3$. In the above, as l^3 increases in direct ratio to the length, it is manifest that its root l cannot increase in proportion to the length, and which could easily be demonstrated. But the strength increases as the square of the length, and therefore we must once more involve l , whence we have $\frac{b^3}{l^3}$. We now make l into feet, which gives us twelve times the crushing strength, l^3 remaining the same, and we now square l and multiply l^3 by b , which counterpoises same. And thus is our formula balanced and ready for use. I do not claim its discovery, but think it is fairly useful. Let us take an example of a roof of 40ft. span. Let its slope be = 25ft., then we say we shall have a resolved pressure of 25cwt. = W on principal, then $25 = 20 \frac{b^3}{l^3}$ $25 = 20 \frac{b^3}{1600}$ $\therefore 1 = \frac{20 b^3}{1600}$ $1 = \frac{20 b^3}{40000}$ and $40000 \div 20 = 2000 \therefore 1 = \frac{b^3}{2000}$ Let $b = 6$, then $6^3 = 216$, and $2000 \div 216$ give 9 nearly \therefore say, 9 \times 6, but as the purlins must so the same less might very well do. Whether queen posts or king posts be used, the strain on principals must be the same. Tie-beam = $\frac{120 \times 2}{3} = 80$, say, 12 \times 7. King-post if used

would only have about half the strain the tie-beam has, and $\frac{1}{2} \times 80$ would do. Struts are only auxiliaries to help support the weakest part of the principal, and if not half the area the principal they support would give them equal strength \therefore about 26in., but taking for area 4 in their length in inches could not fail to give strength enough. Straining beams between queens should be tied into short lengths or increased in sectional area accordingly. The principal rafter we have taken has been supposed to be for a king-post truss 40ft. span. If we were to have a king-post truss 60ft. span, we should, by our formula, obtain a much larger sectional area, being in the duplicate ratio due to the increased length of the rafter and to the corresponding increase of weight included in W , and being in direct ratio to the increase of the span. Now, if we obtain in a queen-post truss of 60ft. span a principal rafter equal in length to our principal rafter in the king-post truss of 40ft. span, the former will exceed the latter in sectional area in the ratio of 60 to 40, or of 3 to 2, and such is provided for in the formula, because when we wish to reduce the side of the equation containing W to unity, we multiply the denominator of the fractional side of the equation

by the integral number representing W , which still leaves both sides equal, whence the fractional side being now equal to one, the numerator, consisting of $20 \times b \times l^3$ must have such numbers assigned to b and l as will cause $20 \times b \times l^3$ to equal the denominator, and which consists now of length in feet, squared by the integral number of which W was composed, and the equation when solved really represents $1 = \frac{1}{1}$ whence, if we write it thus, $a =$

$\frac{z}{y}$ it will be evident that if a increases then y and consequently x will increase in exactly the same ratio, also if a diminishes so will y and x diminish in like ratio, and if we write the equation $a = \frac{wxy}{z}$, then if a increases likewise must z increase, and a similar increase must take place in wxy , and to effect which the altered value may be made in w or in x or in y , because, let a, w, x, y, z , be each equal to 1, then if a becomes 2 then x will become 2, and (wxy) now = 1 must become 2, and which will be effected if either w, x , or y be made 2, whence $2 = \frac{1 \times 1 \times 2}{1} = 1$, whence

it is evident that if we put x for (b^3) and W for a and l^3 for z and c for w , then if W increases or diminishes so will x increase or diminish as soon as we operate on l^3 , in order to reduce W to one, but of course not before. If any one wishing to adopt the foregoing formula for practice should think the sectional obtained thereby to be larger or smaller than they would like to adopt, they could, by varying the constant, increase or diminish them as they might choose, or as the kind of timber they might use might require; because the constant 20 were made, say, 15, it would give $\frac{1}{3}$ increase to the sectional area, and the same would follow with any proportion as, say, put 25 or 20, then $\frac{1}{5}$ of the sectional area would do, $\frac{1}{5}$ being deducted as unnecessary in consequence of the increased power of c , now = 20, but then some other number. With respect to making an allowance for notching the back of the principal rafter, the diminution in strength in large scantlings is small, but not necessarily so large in larger ones, and may be made much, little, or nothing, according to the views of the designer. With respect to considering the extra strength derived by the coaking down of the purlins, it will be well to remember that we must not trust too much to that, because we should not dare to cut the principals across where the purlins came, and trust to the latter to keep the former to their work, and especially when we recollect the butts of the purlins will be cut over the backs of the principal rafters which will materially weaken their tying power, and more especially as the two or three nails on the top may not permanently hold very much, and if the principal is not originally straight it has always a tendency to bend on one side, and might overcome the slight resistance of perhaps a hip at the other end of the purlin, perhaps none too well nailed. If the foregoing fails to make the formula plain to "Nil Desperandum," I do not think I can add more; but if he thinks he can see any fallacy in it and will be kind enough to prove same in figures I shall be glad to reply if necessary.—HENRY AMBROSE.

[5745].—**Wood Roofs.**—I do not quite see what difference between the sectional areas is meant by "Nil Desperandum," as being so great; perhaps he will explain.—G. H. G.

[5753].—**Abutments.**—Henry Ambrose will find, if he will examine his paper, in last week's *Building News*, carefully, that he has made a mistake in his reply to the above question. Spence's "Pocket Book" gives the formula for thickness of abutment

$$T = \sqrt{\frac{1}{3} R^2 + \frac{3}{5} R^{\frac{3}{2}} + \left(\frac{W}{H}\right)^2 - \frac{W}{H}}$$

Taking Henry Ambrose's figures, viz.,
16ft. for Radius ... R in Formula
10ft. Height to Springing of Arch H , do.
40cwt. Weight of 1ft. Length of } W , do.
Half Arch

and substituting them for the letters, then the equation will read—

$$T = \sqrt{\frac{1}{3} 16^2 + \frac{3}{5} 16^{\frac{3}{2}} + \left(\frac{40}{10}\right)^2 - \frac{40}{10}}$$

$$= T = \sqrt{51 \cdot 2 + 38 \cdot 4 + 16 - 4}$$

$$= T = 10 \cdot 27 - 4$$

$$\therefore T = 6 \cdot 27 \text{ ft.}$$

or 6ft. 3in. nearly = thickness of abutment. He will find that the one decimal fifth power of 16 or $16^{\frac{1}{5}}$ is 64, and not 202, as he has it. The following is, I think, a simpler way of finding it than the method he shows:—

$$\text{Log. of } 16 = 1 \cdot 204120$$

$$\frac{1}{5} \text{ Multiply by power}$$

$$1 \cdot 806180 = \text{Log. } 64$$

Again, he has taken the $\frac{2}{3} R^3$ instead of the $\frac{3}{5}$ of it.—W. J. P.

[5757].—**Lime and Portland Cement.**—I should say the mixture of lime-mortar with Portland cement made a good pointing.—G.

[5759].—**Timber Verandah.**—Red or yellow pine or pitch-pine is preferable to oak for outside woodwork. The wood may be simply varnished, or painted with the Silicate Company's paint. I should prefer the latter, as the most durable protective.—G. H. G.

[5760].—**Carrying Weight of Floor.**—If the beams have been cut and reversed so as to insure their roundness, I would trust such a floor with from 2 to 2½cwt. per foot superficial; it will bear, say, 1½cwt. per foot with safety without much deflection.—G. H. G.

[5760].—**Carrying Weight of Floor.**—A pitch-pine beam, 16in. \times 9in., and bearing = 18ft., will carry, including its own weight, as discovered by the following working:—A piece of pitch-pine 1in. square will carry a safe load of 1½cwt. on its centre between supports 12in. apart, and provided the ends are near the supports. We will, for simplification, suppose 1cwt. instead of 1½cwt., and add $\frac{1}{2}$ of our result when obtained to compensate for same. Then 9in. wide and 1in. thick will support under similar conditions 9cwt., and 9in. wide and 16in. deep will carry $9 \times 16 \times 16 = 2304$ cwt., = $\frac{1}{2}$ safe load on centre between supports 12in. apart, and $2304 \div 18 = 128$ cwt. = $\frac{1}{2}$ of the safe load on centre between supports

18ft. apart, therefore the safe load on the centre will be 100cwt., or equal to 8 tons, or 16 tons will be the safe equally distributed load, but care must be taken that an equally distributed load so called does not place more than its proper proportion on or near the centre because otherwise 16 tons would no longer be safe. Now to find the carrying power per foot superficial I shall take as being near enough the girders as 10ft. from centre to centre, and first deduct the weight of the floor itself from our equally distributed load, the floor itself being an equally distributed load. If I were deducting the weight of the floor from a load on the centre, then I should take only half its weight, because the other half would be carried by the walls or supports, but our assumed equally distributed load is assumed already to be half carried by the walls. We shall have girder 18ft. \times 16in. \times 9in., and = 18ft. cube and 15 joists 10ft. \times 9in. \times 3in. = 43ft. cube, and 180ft. of 1in. flooring reduced to cubic feet = 15ft. cube = 61ft. together. A foot may weigh 42lb. = 2,562lb. = say, 23cwt., therefore deduct, say, a ton from the 16 tons equally distributed safe load, which leaves same 15 tons or 30cwt., and our floor space is equally to 180ft. superficial, therefore $300 \div 180$ will give 1cwt. 7½lb. as the weight per foot superficial, which will be a safe load or 1cwt. 2½lb.—HENRY AMBROSE.

[5761].—**Built Girder.**—The thicker plate should be placed on the top, and the working sectional area of the top flange should be to the working sectional area of the bottom flange, as, say, 7 to 4. Then for a 31ft. bearing we have two rolled joists, 16in. \times 6in. \times ½in. web, with a top plate 14in. \times ½in., and a bottom plate 14in. \times ½in., and the whole riveted together. Let us suppose the area of the flanges of rolled joists to be each 5in. Then the top flange will be 14in. \times ½in. \times 5in. \times 2in. = 104 + 10 = 203in. The area of the bottom flange of girder will be = $(14 \times \frac{1}{2} + 5 \times 2) = 17$ in. minus the rivet holes. Let these be four each, $\frac{1}{4} \times 13$ in. = say, 5in. Then 17 - 5 = 12in. = area of bottom flange. Then $\frac{1}{2}$ of 203in. as the working area of bottom flange, or to simplify, call 20½, say, 21, then $\frac{1}{2}$ of 21 = 12, and 12 is the most we can consider as the working bottom flange. If we have less then we consider what we have, while if we have more we do not consider the excess. Thus we have a girder 16in. deep, with a 12in. area bottom flange, and by applying Fairbairn's formula where W = breaking weight in tons on the centre, and c is a constant 80 for a box girder, and a = area of bottom flange in inches, and d = depth in inches, and l = length in inches, we have $c \frac{a \cdot d}{l} = W = 80 \times 12 \times 16 = W \therefore \frac{15360}{372} = W = 41 \therefore 41$ tons is the assumed breaking weight on the centre, and 10 tons may be assumed as the safe load on the centre, and 20 tons may with safety be equally distributed; but care must be taken to render it certain that not more than a fair proportion of the so-called equally distributed weight shall bear on or near the centre, otherwise the 20 tons may no longer be considered safe.—HENRY AMBROSE.

STAINED GLASS.

CIRENCESTER.—A stained glass window has been placed in the Trinity Chapel, of the parish church, in memory of the late Mrs. Cripps. It consists of four lights occupied respectively by full length figures of St. Joseph, the Virgin Mary, Simeon, and Anna. Beneath the window is a memorial engraved brass plate. Some ancient glass has been displaced to make way for the new window, and this has been temporarily placed in one of the windows of the Lady Chapel. The work has been carried out by Messrs. Hardman and Co., of Birmingham. A local journal states that there is a considerable quantity of stained glass taken from different parts of Cirencester Church stored in one of the rooms over the Town Hall, and the suggestion is made that this should be arranged and replaced in the Lady Chapel.

STATUES, MEMORIALS, &c.

BARNSTABLE.—On Thursday last, shortly after seven o'clock, the fountain in the Square was set playing. The structure commences with an octagonal base of granite, the top of which is about 3ft. from the ground. Surmounting this is a plinth and shaft, with carved base and capital, supporting a large basin, which is 5ft. 9in. in diameter, and the lower part of which is moulded from the edge of the basin, diminishing to the centre. The upper part of the basin is moulded, and divided into four parts, a lion's head marking each division. Above this there is a small basin, 2ft. 4in. in diameter, supported by a twisted shaft and a carved octagonal base, and surmounted by a carved capital. At the base of the fountain there is a rockery, in the pond, which is enclosed by a low circular parapet. The best Portland stone has been used for the work, the carving has been done by Messrs. Algar and Pickard, sculptors, of Exeter, and the work has been carried out by Mr. J. Pulsford, of Barnstable. The fountain was designed by Mr. R. D. Gould, the borough surveyor.

EXETER.—A tablet was on Wednesday week erected against the north wall of the nave aisle of Exeter Cathedral to the memory of the late Dr. Wesley, who was for seven years the organist of the Cathedral. The memorial is of white statuary marble, and is Early English in design. It is the work of Mr. Burke, of 17, Newman-street, London.

The Wandsworth District Board of Works have raised the salary of Mr. Barber, surveyor for the parishes of Tooting and Streatham, by £60 per annum.

WATER SUPPLY AND SANITARY MATTERS.

THE WATER SUPPLY OF LONDON.—A deputation of metropolitan ratepayers waited upon Mr. Cross last week, to ask that the Government should take up the question of the water supply of the metropolis. The Home Secretary remarked that the deputation supplied him with no figures showing how the purchase of the present companies could be accomplished. Mr. Watherston said a scheme had been prepared, and would be produced at the proper time. Mr. Cross said they must first consider the terms which the companies would be inclined to accept, and that was all he should say at present.

Our Office Table.

ON Monday last the auction bills which have recently decorated "The White House" in Tite-street, Chelsea, were hastily removed. They had announced the public sale of Mr. James A. M. Whistler's effects and residence on Tuesday morning. The painter effected an "arrangement" with his creditors, it is supposed, or, at any rate, managed, at the last moment, to postpone the sale. Mr. George Lewis, the solicitor, has presented a petition for liquidation on behalf of Mr. Whistler, whose debts amount to about £4,500. The assets are not stated, but the figures on both sides will probably hardly result in a "harmony in black and white," or even in gold and silver.

No less than five large mansions are now in course of erection on the Embankment at Chelsea from the designs of Mr. R. Norman Shaw, whose works stand out from the similar buildings adjoining with that charming individuality which invariably characterises this architect's work, but we cannot always admire his peculiar fancies, such as the wooden sashes in concrete or the sham windows at Holland Park, Kensington, and here at Chelsea we note flat brick arches without any skew-backs, and massively treated bay windows running up, say, three floors of the front, carried on iron columns of such small scantling as to be anything but satisfactory to the eye, notwithstanding the assurance of their ample strength to do their work. A concealed iron girder, following the shape of the bay, is tailed into the wall of the front, and helps to support the weight. There is probably no chance of failure, but the moulded brickwork encases the girder, and the small columns look uncommonly weak.

MR. JAMES CASSIE, R.S.A., died in Edinburgh on Sunday last. He was a native of Aberdeenshire, but has resided in Edinburgh about ten years. He was elected an associate of the Royal Scottish Academy in 1869, and an academician in February last. In the earlier period of his professional career he devoted much of his time to portrait and animal painting, but latterly his attention was given chiefly to landscapes, sea pieces, and river scenes. He was an intimate friend of the late John Phillip, a portrait of whom was one of the best he ever produced. Among his principal works are "The Mussel

Gatherers," "The Mouth of the Mersey," and "The Sea Breaking on a Lee Shore at North Berwick." Seven of his pictures were in this year's exhibition of the Royal Scottish Academy. The deceased was about 60 years of age and unmarried.

MR. W. B. RICHMOND, whose works in the Grosvenor Gallery this year have attracted much notice and admiration, has been appointed by the electors to the Slade Professorship of Fine Arts at Oxford, in succession to Mr. Ruskin. The other candidates were Messrs. Comyns Carr, St. John Tyrwhitt, J. Brett, Watkiss Lloyd, Cave Thomas and J. P. Seddon. The appointment is for three years, at the end of which time the Professor may be re-elected. In losing Mr. Ruskin the University has lost a princely benefactor, the munificent contributor to its art collection, and the creator of its Art School, in connection with which he founded and endowed a teachership of drawing, and presented from his own collection an admirable educational series of drawings for the benefit of the many pupils under the tuition of the present teacher, Mr. Macdonald.

WE referred last week, on p. 525, to the censure passed by "An Architect" in the *Cambridge Chronicle*, on the authorities of Jesus College, Cambridge, for allowing the screens, stalls, and other carved woodwork, placed in the College chapel by Bishop Aleock, to be turned out of Landbeach Church and offered for sale in London without making an attempt to secure and replace it. Mr. W. M. Fawcett, M.A., F.R.I.B.A., of Cambridge, has replied, explaining that the Fellows of Jesus College made an unsuccessful attempt years ago to repurchase the fittings, and a short time since the Dean offered to buy them at the sum Messrs. Kett, carvers, of Cambridge, might regard as a fair value. The offer was declined, and Mr. Fawcett expresses his annoyance at the charge of meanness which has been publicly brought against the College authorities. It is clear, however, that those charged with the pecuniary responsibilities of Landbeach Church restoration think they can get a higher price in London than from the Dean and Fellows of the College, and however much their mercenary spirit is to be regretted, they have an indefeasible right, apart from all sentimental and historical considerations, to haggle with the highest bidder for the carvings the parishioners of Landbeach bought and paid for a century since. Expressions of protest or regret will but tend to advertise the old properties and raise their value.

OWING to the fall, three months since, of a cantilever from beneath the cornice of the Town Hall at Ipswich, unfortunately killing a young man who was passing at the time, the Town Council of Ipswich accepted a tender from Messrs. Bennett for surrounding the building with massive scaffolding, and executing the repairs immediately necessary, at the same time instructing the borough surveyor, Mr. E. Buckham, and Mr. Frederick Barnes, F.R.I.B.A., of the same town, to make a careful examination of the building. They report that the cantilevers, mouldings, and panels under the principal

cornice, executed in Bath stone, are in many places cracked, and in some broken off. The stone has been pieced and patched, and fastened with iron cramps and wooden pegs. The principal cornice is in two thickness of Portland stone instead of one (as is also the coping of balustrade), the joints are laid in mortar of inferior quality and unnecessary thickness, the terminals are insecure, and the joints of the stonework in the dome are defective. They recommend that all the Bath stone be taken out and replaced with Portland, that the cornice be redressed, the defective joints in dome pointed, and the whole of the masonry coated with a solution of silica. This report was considered by the Corporation on Wednesday week, when the revelations gave rise to some discussion. One member, Alderman George Mason, declared that it must be patent to anyone who examined the building that the surveyors had not overstated the matter when they said that it was from bad materials and bad workmanship that the whole of this expenditure was rendered necessary. Stones were used which never ought to have been used; stones were used which were broken either in working the stones before they were put in, while they were being put in, or afterwards. They were fastened with iron clamps and plastered over the face; the action of the atmosphere had removed the plaster and exposed the whole cheat, for it was nothing else. It was a discredit to everyone concerned with it. In the end the report was adopted. The Town Hall is a large building of Florid Venetian character. It was erected a dozen years since from the designs of Messrs. Bellamy and Hardy, of Lincoln, by contract, by the late Mr. Gibbons, of Ipswich, and at the time the late Mr. E. C. Ribbans, then borough surveyor, and a man of great experience in building, was appointed over the clerk of works, at a salary, to supervise the work.

A REPORT has been presented to the Metropolitan Board of Works with reference to the electric light on the Embankment, in which the reporters, Sir J. Bazalgette and Mr. T. W. Keates, state that careful experiments have demonstrated that an engine of 10 nominal horse-power would drive the machines required. During each night of 5½ hours, however, 498½ lb. of Welsh coal were consumed, so that an approximate estimate of what is a "nominal" horse-power in this case may be made. The lights cost for motive power, attendance, &c., 3.24d. per hour each, to which must be added the cost of the "candles." In the opinion of the reporters there is no prospect at present of the electric light competing with gas for general purposes.

SALFORD.—The Salford School Board recently invited competitive designs for new schools about to be erected in Marlborough-street, Salford. Five plans were submitted which have been on view this week. On Wednesday the Board selected the plans sent in by Mr. Lord, and appointed him architect of the building. A premium of £25 was awarded to Mr. J. Lowe for his designs, which were considered as second in order of merit, and Messrs. Smith and Heathcote received £15 for plans submitted by them, which were placed third.

CHAPPUIS' PATENTS

FOR

REFLECTING LIGHT.—DAYLIGHT REFLECTORS

OF EVERY DESCRIPTION; ALSO

ARTIFICIAL LIGHT REFLECTORS.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

A LARGE number of different kinds of glass, good, bad, and middling, have recently been analysed by Herr R. Weber, in order to determine whether any, and what, relation exists between the chemical composition of a glass, and its power of resisting atmospheric influences. It appeared from this inquiry (described in the *Annales der Physik*), that neither the absolute, often considerable, quantity of silicic acid, nor an absolutely small quantity of alkali, produces good quality of glass, but that, besides the correct proportion of the quantities of silicic acid and bases (lime and alkali), the ratio of the quantities of the latter to each other had a specially determinant influence. The composition of many proved lime-alkali glasses approximates the proportion of equivalents: 6SO_2 , 1CaO , $1\text{K}_2\text{O}$ (or $1\text{Na}_2\text{O}$); but good glasses may also contain a larger amount of alkali, if this (otherwise unfavourable) proportion be compensated by more than six equivalents of silicic acid. On the other hand, a less proportion of silicic acid is permissible where the lime is diminished relatively to the alkali. The influence of argillaceous earth, in glasses which contain a large proportion of it, on their resisting power, must be tested by further analysis.

THE announcement that the restorers of St. Alban's Cathedral have now got together the timbers for the nave roof has drawn forth another remonstrance from the Society for the Protection of Ancient Buildings, which now wants to know if the subscribers are prepared for the inevitable consequences the new roof brings with it. "Are they content that the ancient painted ceilings shall be removed or destroyed, victims of the uncouth monster they have created? One of these ceilings is rightly described in the papers of one local archaeological society as 'not to be surpassed in England for beauty or historical association.' They are all of the greatest value, and yet their destruction is certain if the scheme, which has so far succeeded to the entire satisfaction of its promoters, be allowed to progress. Has the last inevitable step yet been reached? May we not still draw back? Will not the subscribers, who have so freely given their money for the honour of the church, gladly give it up rather than buy with it such a loss? The projected roof is quite unnecessary, and while it will rob the church of a long-established characteristic, it can but very uncertainly revive its earlier appearance."

PENTON MEWSEY CHURCH, HANTS, a valuable example of fourteenth-century architecture, which has been carefully figured by Mr. G. E. Street in the second volume of "Weale's Papers on Architecture," is about to be pulled down, and the materials sold to the builder of the new church, which is to be built near the site of the present one. The Society for the Protection of Ancient Buildings, after using every effort in their power to preserve the old church, find that they can only do so by obtaining subscriptions to the amount of £330 from those who value this building in particular, and old buildings generally, in order to pay this sum to the builder in

lieu of the use of the materials of the old church. Subscriptions for this purpose will be received by Mr. William Morris, hon. secretary to the Society, at 9, Buckingham-street, Strand, W.C. All subscriptions so received will be returned unless a sufficient sum is obtained for the purpose, and unless an undertaking is given that the old building shall be kept in proper repair by those who are now responsible for its custody.

THE Leadenhall Market Select Committee of the House of Commons, presided over by Lord Henry Lennox, concluded its labours on Wednesday. The market, which consists of an area of only 3,900 square feet, has belonged to the Corporation for more than two centuries, but around it a much larger market has sprung up. The Bill takes very wide and extensive powers, and one of the principal objections to it was that the whole of the land between Leadenhall-street, Lime-street, Fenchurch-street, and Gracechurch-street was scheduled, and there were no plans showing where the new market is to be constructed. The promoters, however, introduced one clause which provides that the old market shall not be abolished until the new one is ready to be opened. The present suggested site for the reconstruction of the market is along the whole of Half-moon-passage, leading out of Gracechurch-street, and part of Leadenhall-passage. The Committee passed the preamble of the Bill on the condition that the Corporation should construct a new market of not less area than 25,000ft.

DR. SIEMENS, the well-known electrician, has munificently offered the Council of the Iron and Steel Institute £10,000 as the nucleus of a fund for the provision of a suitable house for the societies representing the applied sciences. The members of these associations as a rule move more quickly in such matters than their literary and artistic brethren, and it is probable that the money will be subscribed and the premises erected long before a similar house for the learned societies which has been talked of for so many years, and designs and suggestions for which have been furnished by the dozen, has become anything more than a project. A committee has been appointed by the Iron and Steel Institute to consider the matter, and probably as soon as a site has been selected, plans will be invited.

THE annual Conference of the Society of Arts on water supply, sewage, and health was opened yesterday, and will be continued to-day (Friday). In the absence through indisposition of the Right Hon. James Stansfeld, M.P., Lord Alfred Churchill occupied the chair. The report of the judges upon the essays on water supply, sent in to compete for the medals offered by the society, was laid before the Conference yesterday, and the award announced of a silver medal to Mr. Frederick Topliss, and a second silver medal to Mr. Joseph Lucas for their papers. The papers and discussions are being taken under the following heads:—1. Methods of securing a sufficient supply of pure water. 2. Evils of impurity, and consequent connection

of the water supply and sewage. 3. Methods of sewerage, &c. Amongst the readers of papers are Prof. Hull, F.R.S. (Water Supply of the Eastern Counties), Sir H. Cole, Mr. Edwin Chadwick, Dr. Thorne Thorne (The Recent Fever Outbreak at Caterham), Archdeacon Denison (Water Supply at East Brent), Mr. A. H. Brown, M.P. (Rating for Sanitary Purposes), Mr. Ernest Hart (Connection between Disease and Impure Water), Mr. Cresswell (The Sanitary Condition of the Thames), Mr. J. Clarke Hawkshaw, Mr. Bailey Denton, Prof. Anstead, F.R.S., Mr. De Rance, Mr. Joseph Lucas, Rev. E. C. Clutterbuck, Mr. J. Lynam, Mr. James Dillon, Mr. Baldwin Latham, &c. An exhibition of mechanical and chemical apparatus, relating to water supply, treatment of sewage and health, is being held at the society's rooms during the conference. We shall deal more fully with the proceedings of the conference next week.

THE select committee of the House of Commons appointed to inquire into the Tower high-level bridge bill, the object of which is to construct a bridge over the Thames at the Tower, assembled yesterday. The scheme is submitted by the Metropolitan Board of Works for the construction of a high-level bridge across the river, below the Tower, and consequently below London-bridge. It was pointed out that about one-third of the population of London lived east of London-bridge, and had contributed at one time and another towards the freeing of several bridges west of London-bridge. Under these circumstances he did not consider that the pressure which had been put upon the Board of Works to afford to this third of the population of London additional bridge accommodation, which was greatly needed, was in any way unreasonable. It was admitted that the scheme was not altogether free from difficulties, and that some slight inconvenience would be caused to the home vessels that wished to go beyond the bridge, but he urged that such a great public benefit as this should not be stopped for such a small reason. The only inconvenience would be that some of the vessels would have to strike their topmasts coming up the river. Mr. E. N. Buxton, of the firm of Truman, Hanbury, and Buxton, was then examined in favour of the bill, and the committee adjourned.

CHIPS.

The three-light west window in Redruth parish church has just been filled with stained glass, as a memorial. The subjects are St. John, with chalice, St. Peter, with keys, and St. Paul, with sword and book.

The statue erected by the town of Cardiff to the late Marquis of Bute, and which for over twenty years has occupied a very prominent position in High-street, is about to be removed on account of tramway extensions, to a triangular piece of ground between St. Mary-street, Penarth-street, and New Station-road. The height of the monument will be increased by adding three circular stone steps beneath the pedestal of the statue.

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At Brighton, on Thursday in last week, Colonel Ponsonby Cox, local government board inspector, held an inquiry, which proved purely formal, as to an application from the Corporation for leave to borrow £5,000 for sewerage purposes.

The Local Board of Wirksworth have adopted plans by Messrs. Coke and Mills, engineers, of Chesterfield, for high and low pressure supplies of water to the town of Wirksworth, and to the hamlets of Bolehill, Steeple-grange, Gorse-bank, and Miller's-green. The estimated cost is £3,550.

The Derby Town Council has stultified itself by abandoning, on account of the expense, the scheme propounded under the Artisans Dwellings Improvement Act, and previously adopted. The Local Government Board have sent a sharp missive to the corporation asking for the reasons of the abandonment after the Board had taken the necessary steps for getting a special Act for Derby.

The hall at Barrow-on-Trent has just been decorated by Mr. Cantrell, of Derby, and the pleasure grounds have been laid out by Messrs. John Frettingham and Son, of Derby and Nottingham.

The new Catholic church of St. Joseph, in Elm-grove, Brighton, was opened for worship on the 8th inst. Only the nave has at present been erected. The architect is Mr. Broder, brother of the priest-in-charge.

The contract for the new roofs and bridges required for the improvement of Westland-row Terminus and the widening of the line has been given by the directors of the Dublin and Wicklow Railway Company to Messrs. Courtney, Stephens, and Bailey, of Dublin. The amount is about £13,000.

The corner stone of the new aisle of Christ church, Lowestoft, was laid on Saturday. The extension will provide 140 additional sittings, and is being built from the designs of Mr. W. O. Chambers, of Lowestoft.

The Oswaldthistle local board have referred to a recommendation of the desirability or otherwise adopting the Salford pail system of closets in the township.

The promoters of Selwyn College are about to purchase, for £6,050, 84 acres of land near the Newnham College and the Parallelogram-road, Cambridge, as a site for the proposed college.

The fine old parish church of Shifnal, which contains specimens of all kinds of architecture, from Norman to Late Perpendicular, is about to be further restored, at a cost of £1,000. The work of restoration was commenced under the late Sir Gilbert Scott in 1876.

The monthly meeting of the Bedfordshire Architectural and Archaeological Society was held on the 8th inst. It was announced that Mr. Ransom had completed a description of the church bells of the county, and that the MSS. had been placed in the hands of Mr. T. North, F.S.A., for publication. It was arranged to have an archaeological excursion to Leicester on Tuesday, July 15th.

A new cattle market was opened at Clitheroe on Monday. The cost has been £2,000. The market has been erected from the plans and under the direction of Mr. John Hargreaves, the Borough surveyor.

Last week, in our description of the Yorkshire Fine Art Industrial Exhibition, we omitted to mention that the greater part of the glazing (over the picture saloons, &c.), consisting of 14,000 superficial feet, was done on Rendle's patent system.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Society of Arts. Cantor Lectures, "Recent Advances in Telegraphy," by W. H. Preece. Lecture V., "Automatic and Fast-speed Telegraphy," 8 p.m.
Royal Institute of British Architects. 8 p.m.

TUESDAY.—Society of Arts. Special Meeting. The adjourned Discussion on W. Lloyd Wise's paper on "The Government Patent Bill" will be resumed, 8 p.m.

WEDNESDAY.—Society of Arts. "Edison's New Telephone," by Conrad W. Cooke. Prof. J. Tyndall, L.L.D., F.R.S., will preside, 8 p.m.

British Archaeological Association. Papers on "The Bronze Gates of Ballinavat," by T. Pinches; on "Sculptured Stone in Ely Cathedral," by W. De Grey Birch; and on "Antiquarian Losses in Coventry During a Century and a Half," by W. G. Futton, 8 p.m.

THURSDAY.—Society of Arts. "The History of Alizarine and Allied Colouring Matters, and their Production from Coal Tar," by W. H. Perkin, F.R.S. Part II., 8 p.m.

FRIDAY.—Indian Section. "The Harbour of Karachi," by W. J. Price, M.I.C.E., 8 p.m.
Architectural Association. Paper by W. Penstone on "Late Iron-work," 7:30 p.m.

Royal Institution. W. H. Preece on "Multiple Telegraphy," 9 p.m.

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See half-page Advt. in next Number.

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Trade News.

WAGES MOVEMENT.

BLACKBURN.—The flaggers and slaters are acting in concert, and the effect will be to stop bricksetters, plumbers, glaziers, joiners, carpenters, and all others engaged in the building trades. The masons, flaggers, and slaters have adopted the picketing system. The masons say that wages in Blackburn are considerably under those of other towns—Bolton, Preston, and Manchester. The masters say that the reduction is supported by public opinion.

BLACKBURN.—The stonemasons of this town, numbering about 350, recently received notice of a reduction of 3s. per week in wages, to come into effect on Saturday last. A meeting of the men was held last week, under the presidency of Mr. Alexander Wilson, at which it was decided to come out on strike on Monday for a period of at least three weeks.

CARLISLE.—The joiners of this city have agreed to accept a reduction of ½d. per hour, the working hours to remain the same as before.

DARWEN.—The painters are on strike in consequence of the masters enforcing a reduction of ½d. per hour at one month's notice. The operatives have published a statement that they gave three months' notice when they applied for an increase, and that they expect, in justice, to be afforded a similar time.

HASLINGDEN.—On Monday the quarrymen in the employ of Mr. Thomas Hargreaves came out on strike rather than accept a reduction of 5 per cent. in their wages. They allege that a previous reduction of 15 per cent. having been made, the present reduction is against the decision arrived at that their wages should not again be lowered.

WARRINGTON.—The employers and men in the various building trades, recognising the depressed state of trade, have come to an amicable arrangement for a reduction of wages.

WEST BROMWICH.—A largely-attended conference of operative builders of West Bromwich, Oldbury, Smethwick, and Wednesbury was held on Wednesday week at West Bromwich. The chairman, Mr. Henry Badham, said the object of the meeting was to consider the result of the meeting of the employers and the delegates of the operatives with reference to the proposed new code of rules on the government of the trade. He regretted that the masters had not only declined to entertain the question of the rate of wages paid prior to February last, viz., 7½d. per hour—but had refused the compromise offered by the operatives of 7½d. Had the men been more united they would not have been in their present position, and he urged them to join the union, and so be prepared to resist any further reduction which might be proposed. After some discussion it was agreed that the question of wages stand over, pending the completion of the amalgamation of the Oldbury operatives with those in the trades' union of West Bromwich.

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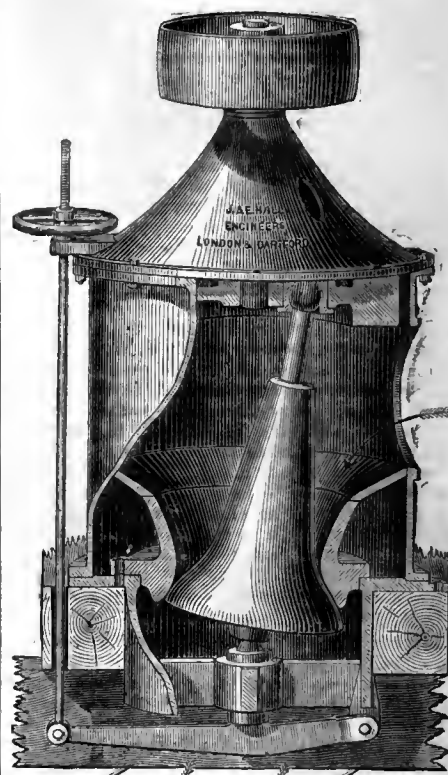
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THE BUILDING NEWS.

LONDON, FRIDAY, MAY 23, 1879.

ARUNDEL CHURCH AND THE DUKE OF NORFOLK.

A CASE of more than usual interest to architects, and especially to those of them engaged in ecclesiastical work, has just been decided before Lord Chief Justice Coleridge, in the Common Pleas Division. We refer to the action brought by the Duke of Norfolk against the Rev. George Arbuthnot, Vicar of Arundel, for trespass, in breaking down a wall which had been built by the Duke to divide the chancel of the church, called by the Howards the Fitzalan Chapel, from the rest of the edifice. His lordship, having taken time to consider, pronounced, on Saturday last, in favour of the Duke of Norfolk on all issues. It may be recollected that the Duke claimed absolute property in the so-called "chapel," which was contended belonged to the original college and not to the parish church of St. Nicholas, and attempted to restrain the vicar from further trespass; on the other hand, the vicar, in his defence, set up a claim to the chancel as being an integral part of the church, praying for an injunction to restrain the Duke from obstructing the right of the parish to light and air by building the wall in question. As the issues of the case are so closely connected with the architectural integrity of the building; and as one of the leading ecclesiastical architects of our day, Mr. Butterfield, was called in support of the defence, it may be of interest to examine a little more minutely than has been done by our daily contemporaries the evidence on both sides. We may at once confess the case is one of those where legal right is stronger than the inherent equitable and moral elements involved, and in reading the elaborate written judgment of Lord Coleridge, we are constrained to say, the architectural unity of the church, so ably supported by Mr. Butterfield, has not had a fair consideration. The evidence upon which Lord Coleridge based his judgment was clearly the acts of ownership on the part of the Dukes of Norfolk. For example, instances were given of interment in the chapel without a faculty, the disinterment of bodies at the free will of the Duke's ancestors; the fastenings of the iron gates in the chancel screen, which separated this part from the rest of the edifice being on their eastern side, and the key having been kept from time immemorial by the dukes or their stewards; strangers had been excluded since the Reformation, and even the neglect and mutilation of the chapel itself was brought forward as one of the strongest proofs of ownership. It was contended that this state of dirt and neglect had been allowed to remain without remonstrance, and that admission which for three centuries was denied to the parishioners had been granted to bats and owls. His lordship, rather needlessly under the circumstances, pointed to the Protestant persecution of the religious belief of the family as some ground for this strange conduct and for the neglect into which this charming building had fallen. Speaking of the evidence for the defence, his lordship said that there was nothing to prove services had been held in the so-called Fitzalan chapel, while the churchwarden's report at episcopal visitations upon the state of the "chancel," then in the transept, were usually that it was "good" or in "excellent repair" at the time the chancel, as the defendant considers it, was in a ruinous state. It will be admitted this view of the case was a little disingenuous.

It did not take into account the ultra-Protestant bias of the time, the ignorance of what constituted a chancel, nor the average intellect of a churchwarden in ecclesiastical matters, nor the over-bearing temper of an English squire of the last two centuries. Referring to Mr. Butterfield's evidence, we contend the conclusions drawn by his lordship appear unsatisfactory. The cases cited as showing that an integral part of a sacred edifice could be vested in a private person scarcely meet the architectural facts which we shall presently refer to, that the building in question is part of the parish church, and that the rights of the priory or college of Arundel, as rector, might have been served equally in such a case. Here was, to even an ordinary eye, a distinctly evident chancel, divided by a screen of unusual openness from the rest of the building, and the decision of Lord Coleridge virtually sets aside a patent fact as irrelevant. So far, then, the judgment given has mainly rested upon acts of ownership proved, and not at all upon the architectural unity of the building; and we have a precedent set of a certainly very unfortunate kind in the interests of architecture.

In reading Lord Coleridge's judgment it would appear things were thrown in to give weight which really were of trifling moment to the real issue. Thus, with regard to the Ten Commandments, their position was misunderstood by his Lordship. In the churches round Arundel, as in all the earlier specimens, the Commandments are, as intended by the Canon, over or round the chancel arch, and at Arundel Church they are still legible in this position, proving it to be, therefore, a chancel arch; but placed in the eastern wall of chancel 80ft. distant they would have been unreadable. Indeed, before the time of Sir C. Wren, who did not build chancels, they were not a customary adornment of the altar-piece. Again, Lord Coleridge, as evidence in the Duke's favour, referred to the entire filling-up with iron lattice of the chancel arch above the screen as unique. In principle, we think this treatment makes the other way, for in the case of most wooden chancel screens the arch would have been filled up solidly, and not, as at Arundel, transparently. The brick wall erection had, too, a far larger meaning than one of light and air; it includes chiefly the question of sound, and helped the Duke, by thoroughly separating the chancel from the nave, to make the former a separate building, suitable for a second congregation, and the worship of a separate communion. The whole value of the chancel is thus altered enormously to the Duke; but certainly "user" cannot be pleaded for this brick wall. Hitherto, everything going on in the nave could be heard in the chancel. This is no longer the case. Again, a point was made of churchwardens' answers; but any one acquainted with them knows how little reliance can be placed upon them, and how ridiculous they often are living archdeacons can testify.

As a distinct architectural issue was first contemplated by the Duke's advisers, namely, that the so-called chapel was a separate building, and not the chancel to the parish church, it may be interesting to give a brief description of the church of Arundel, illustrated in the BUILDING NEWS, p. 146, Vol. XXVII. It is a fine cruciform building, with short transepts, and with a square central tower. The Fitzalan Chapel, as it is called by the plaintiff, extends eastwards as a long, lofty chancel of collegiate character. Between the eastern tower piers an open screen of iron with wide gates exist. On the north side is a large aisle, dedicated as the Lady chapel, with a vestry at its east end, the character of the building is Perpendicular, and it is assigned by Mr. Butterfield to belong to the end of the 14th century. Mr. C. Bowen, in his reply for the Duke, referred to Mr. Freeman's remarks on old

monastic and collegiate churches when connected with parish churches, and assumed without foundation that what was true of monastic and parochial churches was equally true of collegiate and parochial churches. The parish church, formerly monastic and parochial, was rebuilt at the end of the 14th century, as we now see it. The Earl of Arundel, its founder, placed in it a master and a body of chaplains. The property was surrendered by the college December 12th, 1541, to Henry VIII., and was granted on the 26th of the same month to Henry Fitzalan, Earl of Arundel, the last of the Fitzalans. The Howards, who had intermarried, followed them. As regards the term "Fitzalan Chapel," it could not be proved at the trial that the name has any authority, but has been merely invented of late years with a view to making the chancel appear a private family possession. Since the dissolution of the College in the 16th century, the chancel has not been used for service, except the Burial Service of the Church of England; it has always been open to view from the nave, through the original open iron screen in the chancel arch, and has been accessible from the nave for funerals and visitors, by means of its old iron folding-gates therein. These gates and screen still remain. This chancel was described in a letter to the present Bishop of Chichester as being, thirty years ago, in a state of great desolation. Even the costly tombs of the Howards lie in ruin, and so neglected has the chancel become, though claimed as private property by the family, that the idea of its being a part of the parochial fabric has been, as far as could be, weakened in the minds of the parishioners. The conduct of the parishioners, who are also the Duke's tenants, must not, therefore, be judged too harshly. It has been a standing offence; so that the solid building-up by the plaintiff of the chancel-arch in 1873 was only too likely to be acceptable to many of the parishioners, on the mere score of comfort. A quotation from Tierney's "History of Arundel" tells a pitiful story of mischief done by persons employed by Charles, Duke of Norfolk, in 1782. He says they stripped the building of its lead, demolished the parapet, took down the entire roof, which was magnificently groined, and allowed the timbers to fall at random. Beam after beam fell, the stalls were crushed, the tombs were shattered, and the floor broken in. Great stress is laid on what was "commonly called" the "parish chancel" and "parish altar" in the south transept. There is great weight in the argument that the chancel altar was used by the parishioners, who could not avoid distinctly seeing it from the nave at all times, though no doubt small congregations often used the altar in the south transept whenever there would be inconvenience in their using the chancel altar. The latter, of course, being behind the great tower pier, was invisible to the mass of worshippers. Further, the position of the ancient stone pulpit built into the same pier of the tower is another strong point to prove that the building claimed as the chancel is such. This, the parochial pulpit, has its back to what the plaintiff would wish us to accept as the "parochial altar." Hence the pulpit is clearly proved to be in the right relationship to the chancel and its altar. The unusual architectural dignity of the pulpit is undoubtedly important in establishing the unity of the chancel and nave. It would be every way incongruous if the building claimed as chancel were not an integral part of the church. Many quotations can be given to show that the term "chancel" is used, and that the two parts form, in fact, one building; but we cannot devote further space to this point, nor is it necessary now that the integrity of the two have been conceded to the defendant. The case in course of the

trial shifted its ground from the position first taken by the plaintiff, who in the beginning wholly denied the name of chancel, and was concluded on quite another issue. No one with any architectural knowledge of churches could have mistaken the chancel for anything else, and Mr. Butterfield proved demonstrably that the several features of chancel, altar, arch, screen, rood-loft and pulpit must be taken together. The argument of the plaintiff, that the chancel is only a private chapel and not part of an inseparable whole, so absolutely failed that Lord Coleridge disallowed it. The issue has important architectural bearings, and although the evidence adduced by Mr. Butterfield has been set aside, we consider the Duke's position is morally considerably weakened by this trial. It may be mentioned that the architectural evidence was at first much relied upon by the plaintiffs, but the difficulty they found, on applying to architects, in obtaining concurrence in this view induced them to abandon this aid altogether. Thus it is well known that Mr. Butterfield was first asked to act on the plaintiff's behalf, failing which, another eminent ecclesiastical architect was applied to; but after visiting the church he too declined to appear as a witness for the Duke. It has at least been proved to every one conversant with ecclesiastical buildings that what has been, and is still, claimed as a private chapel is absolutely the chancel of Arundel parish church, that it was used as such before the Reformation, and that its after-separation and neglect was due to the general apathy and disturbed condition of the times, and to the overwhelming power which the Dukes of Norfolk, as owners of the whole property of Arundel, have possessed. On another ground, that of right and moral feeling, the decision of Lord Coleridge is even more deeply to be deplored. It will be an unfortunate precedent to those who have vested interests in buildings of this class, though it is equally true our squires have been doing all over England just what the Duke has done for centuries past, and that getting faculties twenty-five years ago was a most rare thing. It is much to be lamented that so beautiful an example of Mediæval architecture should remain in its present condition as a neglected chancel-house of the Howards, instead of being made worthy of the Church to which it has for centuries belonged.

THE NATIONAL PORTRAIT GALLERY.

ONE of the most instructive as well as valuable collections of pictures to be seen at South Kensington, is the National Portrait Gallery located in the old Exhibition galleries in the Exhibition-road, opposite the Science Schools. Though admittedly the building is a makeshift unworthy as the receptacle of such a national display, we find considerable alterations have been made to it of late, and the exhibition, after having been closed, is shortly to be reopened to the public. It may be mentioned that the present galleries formed a part of the Exhibition building of 1862; they were never designed nor intended for pictures, and, we may observe, are constructed in a rather rough and temporary manner, and we cannot indeed, while speaking of the building, omit to say the present magnificent collection of portraits is not so safely housed as we could desire to see. One of the upper galleries is over a sort of mezzanine story, now used as a store, and is often much heated by gas; the floors we find are not fire resisting, and we fear to contemplate such a risk as an outbreak of fire.

The rearrangement that has been made under the direction of Mr. George Scharf is in every way an improvement; the two long galleries to afford the necessary room for the newly-acquired portraits are divided into

bays by screens on the window side, allowing ample passage-way on the other. In the former arrangement the screens were too close, but the present allow a very fair light, besides facilitating the division of the subject into periods. We think also for the purpose of the student and connoisseur this breaking up of a long gallery into bays is a desirable one, as it favours quiet study, and lessens the monotony and tedium inseparable from a long gallery of pictures. In addition to the galleries we see that the old naval room, used formerly for models, has been converted into a large well-lighted compartment by the closing up of the series of windows, and by the introduction of skylights in the slope of the flat timber roof. Commencing at this gallery, we notice an important acquisition of portraits has been made. The trustees of the British Museum have transferred a large collection of very valuable oil portraits, which hitherto has been consigned to one of the dingy and neglected courts of the national treasure-house in Russell-street. Among the collection that Mr. Scharf has arranged with so much skill and appreciation are to be seen a portrait of Craumer in excellent preservation, shewing the great Reformer in his prime; Queen Elizabeth, painted by Zuccheri, is another excellent example, and to show the accumulation of dirt upon it the picture has been half-cleaned. A full-length portrait of the Prince Consort is hung at the end of the room, and we note a marble bust, by Armstead, of Earl Stanhope, the founder of this gallery. Another even more valuable presentation to the national portraits was made in 1877 by the Hon. Society of Judges and Serjeants of Serjeants' Inn, comprising portraits of eminent judges, from Lord Chief Justice Coke, the liberal and independent lawyer of Charles I.'s time, to Lord Denman—a series of great lawyers, of much interest. Descending to the gallery on the first floor, we commence with the Plantagenets, ending 1485, after which are the Tudors. In this epoch we find portraits of Elizabeth and her envied rival, Mary Stuart, Queen of Scots, and her son, afterwards James I., painted as a boy. In the tablet beneath the former it is stated the portrait was painted by Oudry in 1578, during Mary's imprisonment at Sheffield. The portraits during the Stuart period, 1603 to 1714, comprise some remarkable men. Conspicuous in this department is the well-known Chandos portrait of Shakspeare, and King James I., being a full-length seated figure. We also notice a painting of Ben Jonson. The Commonwealth is represented by an excellent portrait of Oliver Cromwell by an unknown painter, painted when Cromwell was 58, though he looks younger. The painting is said to be enlarged from a celebrated miniature in the possession of the Duke of Buccleuch. Another characteristic portrait is that of Thomas Hobbes, the philosopher, of Malmesbury, and the secretary of Bacon. We also note paintings of James Harrington, the well-known author of "Oceana," dressed in the deep collar of point lace and thick, long curling hair—certainly becoming—and having a somewhat dreamy expression; of E. Cocker, arithmetician; and of Edmund Waller, poet. An interesting collection of autographs form a part of the exhibition, and these have at present been arranged in frames by themselves. We notice an original letter, written by Edmund Burke to the Marchioness of Thormond, containing a draft of an introduction to a catalogue of ancient paintings formed by Sir Joshua and sold by Mr. Christie. It was printed for the sale. The letter was presented to the gallery by Mr. G. Scharf, F.S.A. Several portraits of stirring interest are to be found in the part representative of Charles II. For example, besides the portrait of the King and some of his courtiers, a complete series of his

mistresses adorn one screen. There is Louise de Querouaille, who became Duchess of Portsmouth; Nell Gwynn, painted by Sir Peter Lely—a skilfully-executed likeness of this popular courtesan, in blue and brown drapery; the Duchess of Cleveland, &c. Of celebrated men of the period we note Isaac Barrow, the theologian; Samuel Butler, Pepys, &c. The portrait of the Countess of Shrewsbury, by Lely, is a splendid example of portraiture, in the painter's best style, crisp and rich in colour, enclosed in an oval frame. We observed a fine three-quarter portrait of the Duke of Buckingham, the profligate courtier and companion of Charles II., by Lely; one of George Monck, Duke of Albemarle, the General of the Forces, and who defeated the Dutch fleets. The reigns of James II., William III., and Queen Anne are well illustrated by portraits of notabilities. We note a painting of the King, by Riley; another of Lord Chancellor Jeffreys, the cruel judge, painted when he was Recorder of London, by Kneller, though there is nothing in his countenance to indicate the merciless judge; one hand is badly drawn. William Lord Russell, implicated in the Rye House plot, is an excellent painting; while John Lord Cutts, warrior, is a youthful and handsome face, by Wissing. John Dryden, by Kneller, and portraits of Addison, Steele, John Locke, Somers and Congreve are here. Sir C. Wren, by Kneller, painted standing resting his hand on a table, upon which lies a plan of St. Paul's, is the original of a well-known engraving. We have little space to enumerate other portraits of celebrities of the reigns of the Georges. We note a portrait of Sir W. Chambers, painted by Sir Joshua Reynolds, and a capital painting of the great painter himself when a young man, looking at a picture, shading his eyes by his hand. Portraits of Garrick, Warren Hastings, James Barry, R.A., J. Watt, Sir W. Scott, Dr. Jenner, Jeremy Bentham, Sir T. Lawrence, T. Clarkson, the abolitionist of slave trade; Wordsworth, a full-length portrait of Cobden, presented by the Reform Club; John Lord Campbell, Wellington, by Count D'Orsay, and numerous others crowd upon the visitor in the lower gallery. In the present very scant notice of a few of the leading portraits, it has been impossible to say much of the merits from an art point of view of the productions, though the authorities seem to have secured in most instances authentic works by well-known painters of portraiture. The exhibition, we hear, is to be reopened on Whit Monday, when we have no doubt a large and intelligent crowd of visitors will inspect it. The collection ought to be regarded, indeed, as a supplementary aid to the study of our country's history, containing as it does the portraits of the leading actors in the historical drama of the last 600 years. No effort has been spared on the part of the authorities, while the arrangement—at present necessarily imperfect—must be admitted to be a success.

NATIONAL WATER SUPPLY, SEWAGE, AND HEALTH CONFERENCE.

ANOTHER annual conference has closed its labours in connection with the above subjects since we last went to press, but with what effect upon the mass of materials and details accumulated since last year it would be hazardous at the present moment to say. We may, however, assert that no previous sitting of the conference has so large and valuable an array of facts and evidence been brought to bear upon the two great questions that engaged the conference last Thursday and Friday. The papers and suggestions published by the Society of Arts have been of the most varied and useful character, not a few of them having been

contributed by the leading sanitary authorities of the day. The National Water Supply engaged the attention of the meeting the first day, and on another page will be found a report of the proceedings. Lord Alfred Churchill, Chairman of the Council, and Mr. Stansfeld, M.P., presided over the first day's conference, the business of which mainly consisted in the reading of papers, or, rather, the digests of essays to which the Council of the Society of Arts had awarded medals. These contained suggestions founded upon evidence already published, for dividing England and Wales into watershed districts for the supply of pure water to towns and villages; and from a perusal of those which have been premiated, it must be acknowledged the Society have elicited some very valuable hints for future guidance, although more or less crude and imperfect. As we give a summary of these in our report, it will be only necessary here to lay before the reader the leading points of these schemes, reserving our own conclusions with regard to them. We may, however, enunciate a preliminary proposition that seems to simplify the matter, and to reduce the number of really practicable schemes before us. It is the undoubted necessity in any present or tentative scheme of preserving, as far as can be done without the sacrifice of a general principle of action, the existing works for water supply, for a radical sweeping away of everything that has been done at great outlay, for perhaps an entirely new, untried, and imperfect scheme would be a decided national mistake. All the suggestions have one common principle in them—that is, a division of the country into districts, more or less coterminous with the watersheds; and it must be allowed that this is certainly the most scientific principle upon which to base any efficient plan. Existing boundaries for sanitary purposes are acknowledged on all hands to be both inefficient and uneconomical; they are entirely independent of all sanitary and hydro-geological considerations; they cut houses and urban districts in the most absurd manner, and give rise to endless complaints and costly litigation. Areas of unions are not certainly adapted for sanitary purposes, as we have more than once pointed out, as the smallness of the area necessitates imperfect local administration; while the Local Government Board have not the information and local knowledge available which is requisite. In the language of the Royal Sanitary Commission, local administration "should be simplified and strengthened." Mr. Toplis, the author of the first essay printed, proposes to map out the country into watershed districts, "each containing one or more river basins, and that a body of commissioners be appointed to each district; that these commissioners should be assisted by competent legal and engineering advisers, who should have charge of the rivers and waterworks in their district, and that they should have power to acquire all existing waterworks, and if necessary all canals." He further proposes a minister of health with an adequate staff, who should have control over the above commissioners and all sewage authorities and manufactories. The maps accompanying Mr. Toplis's paper propose to divide England and Wales into twelve districts, as follows: The North-West, the Welsh, the Severn (the largest), the South-West, the Southern, the South-East, the Thames, the Eastern Counties, the Lincolnshire, the Midland, the Yorkshire, and the North-Eastern districts. We cannot devote the space necessary to show how these are defined, and indeed without a map any description would be unintelligible; but we may generally observe that the author takes the lines of watersheds separating the great river basins. Mr. J. Lucas is the author of the second essay, the substance of

whose scheme is to make the watershed area the unit of administration for water supply, and that there should be three commissioners' districts and sub-districts formed. The North of England is made one district, the Midland Counties and Wales another, and the Southern a third, these being made on the principle that the rivers flow east and west, and the mountains and geological lines run north and south. By this arrangement each commissioner's district gets its full share of mountain, plain, and geological strata. Mr. Lucas also proposes, as others have done, the creation of Watershed Boards to deal with water-supply, subject to the control of the commissioners. The areas of these boards are arranged into thirty-six natural groups, each being related to the watershed basins contained in it, and which draw their supply from one source. The author refers to the advantages of his scheme, the chief which is the localisation of scientific knowledge and officials in each district, and the avoidance of red tape, the cause of so much friction in administration. A far bolder though impracticable scheme was described by Mr. J. C. Birkett, the author of another paper. It was no less than the collection of the rainfall of the hilly districts of Westmoreland and adjoining counties in reservoirs, and its conveyance by an aqueduct about 514ft. above Ordnance datum, southwards to other high reservoirs round the metropolis, besides distributing branches to towns and villages on its route.

In the discussions which followed these papers, it was conceded by most of the speakers that the watershed area was the proper unit. The remarks of Professor Ramsay forcibly dwelt upon the value of underground sources of supply, and he instanced the sandstone districts, where good water might be obtained if judiciously tapped; while Professor Symons contended for a comprehensive scheme instead of the reckless plan by which a wealthy town got a large supply at the cost of other communities, as in the instance of Manchester and the Thirlmere district. We quite concur in the suggestion that the question should be placed under the consideration of a Minister of Health, and that a central office for the collection of statistics is the first step to be taken. Professor Symons agreed with the former speaker that the Welsh water was as good as that from Cumberland, and he said there were only three of the lakes that were high enough for gravitation supply. On the whole, the evidence of the speakers was conclusive in showing the generally felt necessity for a redivision of areas, and the value of a survey of the underground sources of supply. Professor Ansted suggested the rivers as boundaries; and Mr. Lucas's ideas were endorsed as to the desirability of a hydrogeological survey, and the gauging of all rivers, though, as one speaker said, no hard and fast boundaries could be laid down for districts. Captain Douglas Galton's remarks really contained the substance of the morning's discussion, and, as he said, although there were differences of opinion as to these districts, there was a general consensus of opinion that the printed information we possess should be brought to a focus. Every sanitary official is aware that though there were departments that possessed the information, they were so scattered that time was wasted in practically bringing any fact to bear upon the wants of a district. Captain Galton's idea was to bring into official relation with the Local Government Board the Director-General of the Geological Survey, the Director of the Ordnance, and the Registrar-General's Departments.

On another question, the incidence of rating, Mr. A. H. Brown's paper dealt with a rather difficult matter in a justly comprehensive spirit. Everyone will admit that it is unfair to levy a rate equally upon all the

property in a certain area or parish, irrespective of the actual benefits conferred by water supply and drainage. In many villages some properties are only indirectly benefited, others not at all; and Mr. Brown's proposal is that when a house is drained the cost of the works should fall upon it. The principle that the water supplied by the sanitary authority should be paid for only by the consumer, and the drainage provided should be paid for by a fair charge on the house, is both equitable and just, though the resolution framed by Mr. Brown evidently did not meet all the cases, as, for example, the one forcibly put by Dr. Alcock, of Sunderland, nor that instanced by Mr. Stansfeld himself. It would not be fair, for instance, that the same rate should be levied on a house not directly benefited by a sewer, as that upon another property directly connected with it, though unquestionably the district as a whole is benefited by drainage, and therefore should contribute something; nor would it be just that the cost of construction of sanitary works should fall entirely on those who at the moment of building should want water. As at first worded, the resolution met with opposition, and ultimately, on the recommendation of the chairman, the meeting objected to commit itself to any resolution; and notwithstanding the sound principle inculcated by Mr. Brown, and the fact that the incidence of rating in rural districts demands readjustment, such a decision is in the present unsettled state of opinion prudent. Captain Galton's resolution for the formation of districts under local authorities for administering the water supply also fell through, and Lord Alfred Churchill's subsequent motion, pressing upon Government the necessity of immediate steps being taken to carry out the resolution of last year was carried, though we fear, in the present moribund state of the Government, it is rather hopeless to anticipate any action in the matter. We can only allude to some suggestive papers read by Mr. Lucas, on subterranean water ridges, and by Mr. James Dillon, on the effects of under and arterial drainage, to which we may refer again. Mr. Rawlinson's able remarks in the discussion which followed will check the unbounded faith of many in unlimited sources of underground supply. He showed that the waterless areas were much in excess of water-bearing areas, and that floods were caused by excess of water upon a super-saturated soil. We cannot go quite so far as to agree with him that land drainage had nothing to do with increasing floods.

Last Friday the evils of impurity were largely dwelt upon, the leading paper upon the subject being that read by Dr. Thorne Thorne, the purport of which will be found in our report. The two points that seemed to elicit most discussion were the minute quantity of the poison which gave rise to the outbreak of enteric fever at Caterham, and the opinion expressed that chemical analysis could not distinguish the poison germs—matters that ought not to be overlooked in the interests of future investigations, nor should the legal dictum quoted by Mr. C. N. Cresswell, in the Coker mouth case. Mr. Hart's observations and his summary of epidemics produced by polluted water supply, ably supported the now well recognised fact that epidemics of enteric fever are largely due to water pollution. The tabulated statement appended to Mr. Hart's paper, minutely states the source of supply as the exciting cause, and the circumstances of each epidemic from 1866 to the present day; again Mr. Baldwin Latham's comments were valuable as proving that outbreaks always occur after a dry period, and when the springs have been low, while the effects of irrigation and light in destroying the poisonous character of water, lead to the conclusion that underground pollutions are more destructive than those above ground. The resolution

proposed by Mr. E. Hart, dealt with the above dangers, and met in the only possible way the contamination of watercourses during their construction and repair. Sir Henry Cole urged a very important conclusion respecting sewage farming, namely, that the storm water should be kept out of the sewers, and that precipitation should take place before the sewage flowed on the land. Passing to Mr. Crosswell's interesting paper upon the abortive attempts made to get rid of sewage in the Thames Valley, the pollution of that river, and the recent cross purposes of the Conservators and the Board of Works were alluded to, and a resolution was agreed upon, urging on the Government the necessity of taking legislative measures to prevent the mischief. Captain Galton threw some light upon the adoption of the present sewage discharge, and showed, what we have before contended, that the present outfalls were decided upon in opposition to the opinions expressed by himself and other referees, that the outfalls should be carried below Crossness to Sea Reach, by which scheme one-third only of the sewage, instead of two-thirds, would have been pumped into the river. Captain Galton showed also that if the scheme of the referees had been adopted, the cost would have been considerably less than any alteration now attempted which would necessitate greater depth and the increase of pumping power. Mr. Latham's observations were certainly corroborative. We need not discuss the question of sewage farming. Colonel Jones's experiences at Wrexham prove the undoubted profit to be derived when suitable conditions exist, such as good land and the exclusion of storm water; and the only new feature we need remark upon was the introduction of a pneumatic ejector patented by Mr. Isaac Shone for the lifting of crude sewage by compressed air power. Our space forbids a detailed description of this appliance, though its simplicity of action seems to warrant the idea of its extended use. It is unnecessary to refer to other subjects brought before the conference, such as Mr. H. Master's double-check system of house-drainage—a plan we have before referred to, in which the principle of disconnection is carried out; or to Mr. Banner's well-known system of house sanitation—the demonstrations given of which rather perhaps weakened the value some attach to the cowl as a means of promoting the up-current in the pipe. On the question of the pail system and its cost at Rochdale, the inquiries made tend to show that this system of disposal was still a favourite one in rural districts without a convenient outfall, and that it was gradually superseding the midden. As the chairman said in his summing-up, it dealt with the question of disposal at its source, and avoided all danger from sewer gases; on the other hand, it appears to be rather costly; even the Rochdale authorities were not prepared to give the real cost of the system per house at present, though the plan is gradually being worked more remuneratively. We draw the attention of our readers to Mr. Stansfeld's able summing up of the two days' proceedings, in which he expressed, in masterly terms, the spirit of the conference. As he pointed out, the water supply is a matter for the Government to take up, by a Royal Commission, before it can be fully investigated in all its bearings. The question, at least, has been grasped as a whole, and the general lines of a comprehensive scheme have been sketched, all that is necessary now being a full and scientific inquiry into the watersheds of the country. Larger areas were the result of every discussion upon sanitary matters, the administrative element should be the unit, which once determined on, it is easy to form an aggregate; but, as Mr. Stansfeld observed, this cannot be divided, except at the expense of efficiency.

THE PICTURES AT THE ROYAL ACADEMY.

[THIRD NOTICE.]

ALMA TADEMA has sent four pictures, No. 165 is entitled "A Hearty Welcome"; nothing more exquisite has been done by this very distinguished artist. We are introduced in it to the more affectionate and domestic phase of old-world life. A matron is welcoming a young girl, probably her little daughter, on her return home. This takes place in the flower-garden in the court of a handsome Roman house; poppies, artichokes, sunflowers, all in full bloom, and a very beautiful fountain of bronze and various coloured marbles forms a charming ornament to the inclosure. At the door of the house a light is burning before the household guardians of the place. There are other figures variously employed; one child playing with a shaggy little dog, adding to the life of the subject. Every smallest detail is worked out with unapproached perfection. "Down the River" (No. 238) is upon a much larger scale. A healthy well-to-do matron is bent upon a pleasure trip with her young family. As they go down the steps to the water they are plied by the stalwart boatmen offering to take the lot on most approved terms. No inconsiderable part of the composition is a splendid bridge enriched with fine bronze statues and ornaments; over it is coming a gay procession, bringing to mind the strictures of Juvenal upon the Romans' extravagance in all that concerned the road, drawn with marvellous minuteness. A rich and splendid galley is just shooting through the centre arch of the bridge. 351, "The Pomona Festival of Dancing Round the Fruit Trees in Blossom," though as well painted, is not so generally interesting as the foregoing. Mr. Ansdell exhibits four of his boldly and truthfully painted representations of rough Highland scenery with cattle, the most important being the stray lamb, where a little lamb has just been recovered from what would seem to be an almost impossible position. In No. 237, "On Guard," he has united a very highly-finished painting of a great bull terrier with a portrait of a gorgeously appressed baby, over whom the dog is watching. The "Storm in the Glen" is also a good specimen of the artist's best work. P. Graham and James Macbeth each show a mastery over wild northern scenery; 219 by the former, "Cloudland and Moor," and "The Land of Argyle," by J. Macbeth (No. 222), could not easily be better in strict observation of nature. No. 1,386 is a grand study of inaccessible cliff, the home of unnumbered sea fowl, amid the deep shade and dark green water of the deep profound that washes the perpendicular rocks. No. 1,395, "Catherine Douglas Barring the Door with Her Arm Against the Assassins of James I. of Scotland," by L. J. Pott, would be more satisfactory if more attention had been paid to the details and furniture of the room. Several things therein are of a much later date than the time represented in the picture. John Pettie's portraits are forcible and bold. We have also by him in No. 220, "The Death Warrant," one of the finest productions of his pencil with which we have yet been made acquainted. A young and delicate prince—no doubt intended for Edward VI.—seated at the council-table seems lost in pain and difficulty, unable to bring himself to sign the death warrant, probably of his near kinsman, which one of the councillors, with pen in hand, is offering him. The grouping and expression are excellent; the richness of colour and breadth of treatment suggest an influence of the old Venetian school. The old man to the left, who sits sadly regarding the young prince, is very finely imagined. The diocese of Lincoln is to be congratulated on the acquisition of so excellent a portrait of their

bishop, the Right Rev. Dr. Christopher Wordsworth (No. 1,423), by E. Long. The prelate is represented in the rich Convocation robes, with a splendid crozier to his right hand. Scarcely less worthy of notice is No. 562, the life-long friend of the Baroness Burdett-Coutts, Hannah Brown—"Whereas I was blind, now I see." To lessen the unpleasant effect of blind eyes, Mr. Long has thrown a veil of black lace partly over the face. In so interesting and beautifully-painted a portrait, we think this was hardly necessary, though it gave the painter one more opportunity of showing his power of reproducing any texture—a power already shown in all the dress. Sir F. Leighton's portrait of the Countess of Brownlow is also a masterpiece. She stands majestically, arrayed in massive white satin robes, superbly painted, holding a great bunch of splendid dark-red roses in her right hand. The massing of colour is most skilful. Another of the Academicians who usually have chiefly excelled in historical subjects, but who this year show their power in portrait-painting, is J. C. Horsley. His portraits of Mr. and Mrs. Jessop, of Engfield Grange, Sheffield, will add to his reputation. One fancies that they must be speaking likenesses. They are solidly and cleverly painted. We hardly know which to admire most of B. Riviere's pictures. The most ambitious doubtless is that to which he has ascribed the legend, "In Manus Tuas Domine," No. 487. This is of larger size and higher aim than what he has usually produced. We have in it still the intimate knowledge of the structure and habits of animals which is always conspicuous in his works; but we have also figure-painting of a high order—something more than the domestic subjects which we have been used to. A warrior, steadfast in faith, and holding up the cross hilt of his sword, in token of the trust he feels in the great Being into whose hands he commits himself, is just about to enter the Valley of Death—symbolised by the weird bats flitting across his path, and the wriggling serpent among the crimson toadstools—the terror of the horse and hunting-dogs which have been his companions is graphically expressed; the painting of the silver armour is very fine. Few will pass over the "Winter's Tale," No. 963. Two fine colley dogs have just found a poor little girl, lost in the snow; they are none too soon, for the sleep that has come over her would soon be eternal. The foremost dog hastens to lick his young friend and warm her back to life; while his companion stands on the top of a knoll waiting to show his master that the search has been successful, if not too late. The "Poacher's Widow" is perhaps a more remarkable scene of animal life than we have had before. Whether any preserves are ever so rich as that depicted here may be questioned. If there are any such, the poachers must have a thriving time of it, if they keep clear of the keepers. The husband of the poor creature, crouching in her agony in the pale moonlight, under the flowery gorse, spilt his blood in that fair, cheerful spot, and she is well-nigh mad in her indignation. The hares, rabbits, and pheasants literally revel in the fat barley field. Close to this picture there is a very clever portrait, by Frank Holl, of Samuel Cousins, the eminent engraver, which will be very welcome to the many admirers of his great skill. Very appropriately, his engraving of the "Strawberry Girl," after Sir Joshua Reynolds, appears on the wall to the right hand of the engraver. Above this picture is a family group (No. 194), "The Wife and Children of Lieut.-Col. George Arbuthnot," by C. E. Hicks, which reminds one of Sir Joshua's style more than any portrait in the exhibition. "Signor Piatti" (No. 579), by the same artist, is worthy of the highest praise. G. Richmond's best portrait is that of Sir W. H. Stephenson (No. 56). All of those

by G. F. Watts are characterised by the same great merits and a certain mannerism which has distinguished his work for several years. No touch is unconsidered or without its effect; still there is a muddiness of colour which is seldom, if ever, seen in nature. There are several admirable portraits by Mr. W. Onless, some interesting for the subjects; all, more or less, for the goodness of their treatment. All lovers of art will be glad to see so speaking a likeness as No. 64 is of John Malcolm of Portlough. John Bright, too (No. 183), will be a welcome acquisition to the Manchester Reform Club. G. A. Storey's portrait of a lady, the centre of a flowery bower of lilies, oleander, and the pink, is delightful. She sits among the flowers there and almost looks like one of them—she is so fresh and fair—under her fanciful Japanese sunshade. Of his other portraits No. 421 is by far the best. Mr. Sandys' portrait of Mr. Temple Soanes is a bold piece of colouring, the massive blues and whites of the dress being set off by a quantity of roses and other flowers, finished with much labour and skill. One of the most delightful single figures in the rooms is Mr. Boughton's "Prisella" (No. 430), a subject taken from Longfellow's "Miles Standish." She is walking, in her calm beauty, look in hand, through the snow. It is a subject eminently fitted to bring out the excellences of this artist's manner. His chief picture is No. 330, "A Resting Place."

"Tis a sad eye that sees not
A golden apple somewhere."

Footsore, tired, and wretched, a family, who have tramped the dusty road many a weary mile, have rested awhile under a spreading oak. The older women are too miserable and borne down to have any thought but for their troubles. Not so, however, the children, one of whom is enjoying a fine rosy apple which she has somehow become possessed of. The father, too, of the family, consoles himself by patting a little bull pup, while its mother looks on approvingly. Valentine C. Prinsep's study of H. H. Sujan Sing, Maharana of Oodepoore, is a vigorous sketch. His "Room-i-Sultana" is one of the best pictures of the year. He has set himself to compose a picture with the whole of the colouring in some shade of red. The scene is a room in a palace at Futehpore—Sikri, built of dark-red sandstone; and within its curiously-carved walls, covered with delicate patterns in low relief, the fair European wife of the Emperor Akbar reclines in luxurious ease, and splendidly attired, on rich carpets; all round her are spread jewels befitting the bride of so great a prince. As a set-off against the fair beauty of the princess, a fine, dark Eastern slave fans her mistress with a white horsehair flapper. The curious and difficult problem has been worked out with perfect success.

All the pictures bought by the President and Council of the Royal Academy under the terms of the Chantrey bequest, have points of interest. The present choice seems to fall upon those who have bestowed the greatest amount of work upon actual copying of nature. Whether this may not lead to the adoption of a super-realistic treatment in those who aspire to the honour of being selected is a question well worth consideration. Take No. 21, "The Waning of the Year," by Ernest Paxton, for instance. As a fact, does the unaided eye ever see natural details so minutely as they are put down on this canvas? "Nausicaa and her Maidens" is again a favourite subject. Mr. Poynter (No. 307) has chosen the place "where the queen, now for the upstroke, quite wide off the other maids, struck the ball and made it fall amid the whirlpools" (Odyssey). As she, standing with her back to the spectator, strikes the ball away, the central group of women stand expecting the stroke; to the

left are others, washing the clothes in the river. A boy, nude, running in front adds life to the piece. The drawing in parts is unequally carried out. No. 403, "The Return of the Victors," by Sir John Gilbert, is an ideal picture rather than a representation of anything that could really have taken place. It is a fine study of colour and grouping, such as few artists of our day would attempt. On the other hand, we feel that poor Evangeline (No. 1,422) would have actually sat as Frank Dicksee has placed her, beautiful, pure, and single-hearted, trying to inspire hope and minister comfort to her aged friend, though feeling little herself. The story is graphically told. There are the two cruel ships-of-war that will pitilessly and indiscriminately carry away from their dear homes and heart-loved friends many who will never again meet in life; furniture heaped up in confusion, among sorrowing mothers with sick children; and the trained soldiers, careless of anything but the stern duty they were told off to perform. The downcast head of the old man shows how "vainly Evangeline strove with words and caresses to cheer him." The lurid light on the water well sets off the ghastliness of the scene.

Mr. Brett's landscape this year is quite as remarkable, though less pleasing, than his beautiful "Cornish Lions." No living artist surpasses him in fine eyesight and power to transfer to canvas or paper what he sees. The subject of this picture (No. 693) is called "The Stronghold of the Season and the Camp of the Kittywake." The old fortified seaboard, backed by green hills, flooded with the dazzling glow, with the ship-studded sea in front, form a picture such as few painters have had the courage or ability to attack.

CONFERENCE ON NATIONAL WATER-SUPPLY, SEWAGE, AND HEALTH.

THE fourth annual conference on these subjects held by the Society of Arts took place on Thursday and Friday in last week. On the former day Lord Alfred Churchill presided, in the absence of Mr. Stansfeld, through indisposition, and stated that the Council of the Society of Arts had offered one gold and three silver medals for the best suggestions founded upon evidence already published for dividing England and Wales into districts, for the supply of pure water for towns and villages in each district. The committee were of opinion that none of the essays sent in was worthy of a gold medal, but they had selected two which they thought worthy of silver medals, the names of the successful competitors being Mr. Frederick Toplis and Mr. Joseph Lucas. Mr. Toplis proposed that the country should be mapped out into watershed districts, and that a body of commissioners should be appointed to each district; that these commissioners should be assisted by competent legal and engineering advisers, who should have charge of the rivers and watersheds in their districts, and should have power to acquire all existing waterworks and, if necessary, canals. It might be desirable that a Minister of Health should be appointed, with a proper staff, and that he should have control, not only over the commissioners, but over all sanitary authorities. Mr. Lucas, with reference to his scheme, propounded that England should be divided into three principal districts—the Northern, the Southern, and the Midland, the divisions being made on the principle that the rivers flow east and west, and the mountains and geological lines run north and south. Considerable discussion followed the explanations of these schemes given by the authors, in the course of which it was generally admitted that England should be divided into districts for the purpose of regulating the water supply, and several speakers considered it desirable that a Minister of Health should form a member of the Government. Papers were read by Mr. A. H. Brown on "The Incidence of Rating for Sanitary Purposes in Rural Districts," by Mr. Lucas on "Subterranean Water Ridges," and by Mr. James Dillon on "The Effects of Under and Arterial Drainage on River Floods." In the course of the discussion which

followed, Mr. Rawlinson, of the Local Government Board, remarked that the waterless areas were much in excess of the water-bearing areas. They had only to go deep enough and they would get water. There were mines in the northern counties which went down from 1,800 to 2,400 feet. At the close of the proceedings the following resolution was unanimously passed, on the motion of Lord A. Churchill and Captain Douglas Galton:—"That this Conference wishes to express its entire satisfaction with the action taken by the Prince of Wales in applying to the Government for a Royal Commission to inquire into the subject of the national water supply, and earnestly hopes that the Government will take steps without any delay to carry into effect the resolution of last year's Conference."

FRIDAY.

The Right Hon. James Stansfeld, M.P., occupied the chair throughout the day.

DR. THORNE THORNE gave a lucid description of his investigations into the recent disastrous outbreak of enteric fever at Caterham, Redhill, Earlswood, and Bletchingley, which he distinctly traced to the employment in an adit, between the Caterham Water Company's wells, of a man who was suffering from a mild form of enteric fever, and who was compelled to evacuate whilst in the adit. Other cases of enteric fever epidemics conveyed by water supplies at Guildford, Over Darwen, and Lewes, were described. From these he drew the following conclusions:—1. That the view, to the effect that even a comparatively minute quantity of the poison contained in the evacuations of enteric fever patients, may, when subjected to conditions favourable to the development of that poison, lead to the specific infection of very large volumes of water to which it has gained access, is fully borne out. 2. That a special danger attaches to the prevalence of the mild—or, as they had been termed, "perambulatory"—cases of enteric fever, by reason of the intensely poisonous nature of the diarrhoea which characterises that disease. And having regard to these facts—3. That all possible sources of excremental contamination in the vicinity of watercourses should be rigidly dealt with. 4. That care should be taken, in connection with works for the construction or storage of water, to exclude from employment all persons suffering from any diarrhoeal affection.

In reply to various questions, Dr. Thorne said he attributed the comparatively light mortality in proportion to the number of cases to the extreme dilution of the poison; that in every case where the poison was presumably much diluted the epidemic was comparatively mild. He had not allowed the Caterham water to be analysed, as he did not believe the poison germs could be chemically distinguished. Mr. Cresswell quoted the Cokermouth case, in which the dictum was laid down by the Master of the Rolls that it is not necessary to prove the existence of a nuisance polluting a source of water supply in order to obtain an injunction against the polluting party; it is sufficient, for legal purposes, to show that there is a potentiality of water-pollution.

MR. ERNEST HART followed, with a paper upon the epidemics of enteric fever produced by polluted water supply since the passing of the Sanitary Act, 1866. Every considerable epidemic caused by bad water during the past 13 years had been investigated by the Government, and of these, amounting to some hundreds, all but a few have been proved to owe their origin and spread to polluted water alone. In the subsequent discussion Mr. Baldwin Latham, C.E., gave numerous cases of enteric fever outbreaks and immunities from them in Croydon and neighbourhood, to show that the disease spreads directly the water rises in the subsoil of a source of supply, and that the exposure of contaminated water to the air and light removes the poisonous qualities of the supply.

DR. ALCOCK, Sunderland, urged that, on account of the difficulty of ascertaining facts of possible pollution from private water companies, the supply of water should be transferred from companies to local authorities. Dr. Thorne explained that the Caterham water company afforded him every possible facility and information, even while sceptical of his theory, and had since adopted his suggestions for disinfecting the adit and wells. After further discussion the following resolution was proposed by Mr. Ernest Hart:—"That, since a comparatively minute

quantity of the poison contained in the evacuations of the patients of enteric fever may, it is believed, when subjected to conditions favourable to development of that poison, lead to specific infection of our large volumes of water to which it has gained access, all sources of excremental contamination in the vicinity of watercourses should be rigidly dealt with during their construction or repair, and in their use." Mr. Hart went fully into the occult question of the presumed growth, propagation, and destruction by oxidation, of enteric fever germs, and urged the importance of exercising the greatest vigilance over water sources. Mr. C. N. Cresswell seconded the resolution, on the ground that he believed its passing would aid in preventing the intermarriage of the domestic well with the domestic cesspool, and because such an expression of opinion from the Conference would strengthen the hands of local authorities in carrying existing legislative powers into practice, and in inciting them to demand from the Government further reforms in the prevention of river-pollution. The President having pointed out the practical character of the resolution, it was carried unanimously.

In the afternoon methods of sewage were dealt with. The subject was opened by a paper read by Sir HENRY COLE, on "The Progress with Sewage since the First Conference in 1876." He held that while the public ignorance on sewage subjects was still universal and deep, it was becoming less so. For all that, every house in London was but a ventilating shaft for sewer gas, and the same evil prevailed in many large towns; the Thames in the metropolis remained as foul as ever, and in large provincial towns passiveness only appeared to reign. Two or three conclusions respecting farming by sewage now seemed to be admitted. (1) That the storm water must be kept out of the sewers; (2) that precipitation must take place before the sewage flows on the land; (3) that filtration of some kind after precipitation was most desirable; (4) another conclusion was, that towns cannot make a profit out of water-carried sewage. He thought compulsory federation of small places under a united local management was ripe for the Local Government Board at once to insist on, and on this point read some correspondence which had passed between the Duke of Sutherland and the Local Government Board. Sir Henry Cole added that he had thought the progress of sanitary science had been retarded by the prejudices of the inspectors of the Local Government Board in favour of irrigation; but in reply to a complaint he had forwarded to that authority he had received a reply from the present President of the Board, stating that the inspectors are instructed not to express publicly any opinion upon the proposals into which they are inquiring, and that the Board are "only too glad to have brought under their notice any scheme which can be reasonably relied upon as combining economy with efficiency in sewage disposal." In conclusion, Sir Henry pointed out that in the present state of public opinion and knowledge, strong compulsory legislation on sanitary matters is hardly possible and not desirable.

Mr. CRESSWELL followed with a paper in which he described in humorous and sarcastic terms the successive attempts which have been made during the last 30 years by Richmond and other towns in the Lower Thames Valley to get rid of their sewage. Hemmed in by Royal parks on either side, a river in front, and a railway behind, Richmond had yet been urged by the Thames Conservators and the Local Government Board to discontinue passing its sewage into the river, while every scheme for conveying it away had been successively frustrated. The latest scheme was that prepared for the "United Drainage Board" of the whole Valley by Colonel Haywood and Mr. Peregrine Birch, and involved the pumping of the sewage over 800 acres of land near Moulsey, and this had been strangled by the House of Commons in its second reading.

Mr. RAWLINSON, chief inspector of the Local Government Board, denied that instructions were given to the inspectors to recommend irrigation schemes. For many towns the requisite land for a sewage farm could not be obtained, and in the manufacturing districts it was of paramount importance that the water should be clarified on the spot and utilised for trade purposes. As to the alleged dangers from the pollution of rivers, there were two sides to the question, and he was

not convinced that any injury to health could be proved from this cause except where the water was used for potable or domestic purposes. Captain Douglas Galton thought the duty should entirely rest on the Metropolitan Board of Works to carry out their original idea of removing sewage and purifying the Thames. After further discussion, Mr. Cresswell agreed to the following amendment of the resolution with which he had concluded his remarks:—"That this conference recommends the Council to arrange that a deputation wait on the Government to urge the necessity of taking further legislative measures to prevent the continuance of the pollution of the Thames by sewage." This was seconded by Sir Henry Cole, and carried by a large majority.

Mr. BALDWIN LATHAM, C.E., described the system of sewerage and sewage disposal he has carried out for the Croydon Rural Sanitary Authority for Beddington, Merton, Merton-Rush, Mitcham, Morden, and Wallington, an area of about 16 square miles, with a population of 16,000. A scheme is now being rapidly carried out, by which six-sevenths of the sewage of the combined districts will be conveyed by direct gravitation to an area of 38 acres of land located partly in Wimbledon and partly in Mitcham. The sewage will be pumped to a height of 25ft., and dealt with by filtration through the soil. The total cost of the undertaking is estimated at £90,000, and will probably be exceeded on account of the rapid increase of population. In reply to questions, Mr. Baldwin Latham expressed the opinion that a filter bed 6ft. thick and an acre in extent will purify the sewage of 3,000 persons.

Lieut.-Col. A. S. JONES, V.C., gave an account of the seventh year of his dealings with the town sewage of Wrexham, on his sewage farm at Hafod-y-Wern. His experience had shown that a sewage-farm, given the right sort of land and undiluted sewage, would pay the farmer a rent of £1 to £5 per imperial acre, and make a fair profit for his time and capital. He also described the pneumatic ejector which had been invented by Mr. Isaac Shone, and which was regularly used on his sewage farm, for the intermittent lifting of crude sewage, at the rate of about 4,000 gallons per hour to a height of nearly 40ft. An advantage was that one air-compressing engine would work a large number of ejectors at any distance from the engine. In reply to Mr. Cresswell, Col. Jones expressed his opinion that such a pneumatic system would be very useful in towns on the flat, such as Brentford and Southport. He advocated the entire exclusion of storm water from sewers, and believed that means of flushing would be easily found by temporarily damming up the sewage, or utilising the water mains.

Mr. HENRY MASTERS explained, by means of diagrams, his double-check system of house drainage, for which he claimed great simplicity. In its most simple form the system consisted of a pipe drain from the back to the front of the house, joined at the back of the house to the vertical soil-pipe, to which were connected the w.c. pans. To cut off the house from the public sewer, there were put down two common siphon traps, connected together by a short junction pipe, to which was attached a large iron escape pipe, extending above the house roof. He also provided for sudden flushing of the pan and soil-pipe by making the pipe from the flush tank of large dimensions, with valve and way to pan of equal capacity. A point in applying his system was that every speciality or mechanical contrivance was avoided; he used the common form of trap, ordinary glazed ware pipes, sometimes with Stanford's joints, and stout cast-iron soil and air pipes.

Mr. E. G. BANNER explained his system of house sanitation, and performed some experiments with a view to exhibit the exhaust power of the cowl he introduced in 1874. A glass tube after being filled with the smoke of a taper was speedily cleared by blowing upon the cowl at the top; and a 60ft. length of flexible pipe was similarly freed from smoke with the aid of a pair of bellows. Mr. T. Welstencroft and others in the audience pressed Mr. Banner to repeat the experiment on the tube without the cowl; this being done, the smoke passed off when Mr. Banner blew over the top of the tube, and indeed when a cork was removed from the side of the tube an updraught was created, and the fumes escaped without further assistance.

Dr. VACHER explained the pail system as carried out in several towns in Lancashire, in an

address which gave rise to some discussion as to the cost and convenience of the method as practised in Rochdale, Warrington, and parts of Manchester.

The CHAIRMAN closed the conference by an address, in which he summarised the results of the two days' proceedings. He congratulated the meeting upon the mode in which the work had been carried out, and observed that the varied subjects for thought and the suggestive papers would be inducements to lead to a continuance of these conferences. He wished there had been more time to discuss the pail system. The conference had in previous years expressed the opinion that this was a vast improvement on the older methods of disposal, those of privies and middens. The town of Rochdale was adopting a new method of collection, and particulars as to the comparative cost of this and other systems would be looked forward to at the next conference. Whatever the defects of the pail system, it dealt with the question of disposal at its very source, avoided the possibility of the generation of sewer gases, and, however troublesome and expensive its working might be, in adopting it a town was not sinking money on large works which might turn out to be constructed on a wrong principle, or even inflicting a greater injury on some other district. Where there was not a dense population, and no convenient outfall, the pail system was probably the least costly method of sewage removal. With reference to the question of water supply, discussed on the previous day, the conference had, he thought, acted wisely in throwing upon the Government of the day the *onus* of inquiry into the subject by Royal Commission. Should the Government accede to this wish they might anticipate that the question of supply would be investigated in the fullest manner and on the broadest lines; should the Government decline to do so, he thought the Society of Arts ought to be prepared to act in the matter. An extremely important subject was that of the connection between the contamination of water supply and the spread of enteric fever, and they would have no reason to repent the resolution they came to, based as it was on clear and confirmed scientific evidence. Sir H. Cole had urged that an inquiry office should be started by the Local Government Board, and he believed the chief obstacle in the way of this suggestion being carried out was that of ways and means. He had also advocated the federation of rural local authorities, and this, indeed, had been the tendency of the whole proceedings, that both for water supply and sanitary purposes large areas of local government should be adopted. He thoroughly concurred in this, and believed that these larger areas ought to be a portion of the long-talked-of county board scheme. In expressing a hope that they would meet again next year, he ventured to think that the conference proceedings had been neither ineffective, unimproving, nor unimportant, and that members would take home with them many useful ideas for future consideration.

The proceedings closed with a vote of thanks to Mr. Stansfeld for his conduct in the chair and his closing address, proposed by Dr. Yeld, of Birmingham.

NATIONAL WATER SUPPLY EXHIBITION.

A HIGHLY instructive exhibition of plans, sections, apparatus, and appliances, illustrating various means in the adoption and maintenance of a National Water Supply, is now open in the gallery of the Royal Aquarium at Westminster, to which we may draw attention. The arrangement into sections and the details of the different exhibits have been carried out by Mr. John T. Carrington in a manner that reflects credit upon that gentleman. We may briefly say at the outset that the idea of a collection of this kind originated from Mr. Mitchell, who compiled the "Notes on Previous Enquiries" for the Society of Arts. There is doubtless more to be learnt of scientific facts and data by a collection of models and diagrams than by any other means, and the management of the Aquarium have wisely taken advantage of the idea. Having paid a visit to the exhibition, we find the gallery is divided into several sections. In section I. the collection and storage of rainfall is illustrated, Mr. Symons exhibiting several diagrams. In section II. Mr. J. Lneas, one of the prize essayists of the Society of Arts,

shows a large map, in which the hydrogeological survey is applied to the geological map, indicating the difference in the two works. The maps showing water contours on the chalk system and the several sections between the Darent and the Mole, drawn to a large scale, will be found specially interesting to those engaged in these pursuits. Speaking of maps, we may mention Mr. Stanford's admirable Library Ordnance Map of London, showing the geological boundaries. Mr. Jordan's model of the great Wealden area, and Mr. de Ranee's diagrams exhibiting the absorption of various rocks, besides others, illustrate thoroughly the geology of the country round London. Many of the plans for bringing water to the metropolis from the Welsh and Westmoreland lakes are to be seen. Several portable spongy iron filters are exhibited by Messrs. Defries and Sons and Messrs. Griffin and Co.; and Dr. Clark's and Prof. Wanklyn's apparatus for hardness and testing. A very interesting section is No. V., devoted to several appliances. Among these we notice the Diamond Rock Boring Company's apparatus, and Messrs. Blakeborough's water fittings, the latter exceedingly well turned out; also Messrs. Warner and Son's pumps, &c. In the water pollution department is a bottle of sample water from the Pontypool Waterworks, showing live leeches, exhibited by Mr. Williams, of Pontypool. In another department we observe a fine series of views of old London, from the collection of J. E. Gardner, many illustrating old wells, conduits, and watercourses, such as the old conduit, Cheapside, Hampstead Wells, sketches of the Fleet, &c. Views, including some exceedingly choice engravings and sketches of old London Bridge, Walbrook, Lambeth, Bridewell, Clerkenwell, Islington, Cannonbury, Highgate, Newington Green, will well repay the archaeologist and student. We note among these a fine engraving of the Fleet marked by G. Dance; an arcade with centre enpola, in the Italian style; a fine mezzotint view of Hanover-square, engraved by Pollard and Jakes; the Old Queen's Head, Islington; a three-story overhanging house in a 16th century style; the old Angel Inn, Islington; a red brick and tile building of Queen Anne character. Though an experiment, we hope the collection will secure the patronage it deserves and induce periodical exhibitions of a like character.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE tenth ordinary meeting of the session was held on Monday evening, the newly-elected President, Mr. John Whichcord, in the chair. Messrs. Thos. Henry Wheeler, Heathfield, Wandsworth-common; and John Groom, 21, Finsbury-circus, E.C., were elected as associates; and Mr. John Robert Bourne, Bedford Office, Bloomsbury, W.C., was elected as an honorary associate.

THE FORTHCOMING AUSTRALIAN EXHIBITIONS.

The PRESIDENT said that the Council had experienced considerable difficulty in arranging for the proposed Australian exhibitions at Sydney and Melbourne, owing to the short time at disposal in which to make preparations. No doubt this inconvenience would be equally felt by intending exhibitors, and he would therefore call attention to the intimation they received from the Prince of Wales, that the Royal Commissioners would be willing to receive any drawings which were exhibited in Paris last year. No delicacy need be felt by architects in availing themselves of this invitation, as scarcely any of those who would visit the Australian exhibitions were present at the Parisian one. The selection of drawings would be intrusted by the Royal Commissioners to the Council, who would act as a committee, and Mr. T. Roger Smith, who assisted at the Paris Exhibition, had again volunteered his services as honorary secretary. Unexecuted or competition drawings would not necessarily be rejected. He would earnestly appeal to members to do their utmost to aid in making such an exhibition as would do credit to English architecture, and show to our brethren in Australia the character of the works now in progress in the old country. Mr. WHITE (secretary) read the circular-letter which it was proposed to send out to every member of the Institute, which stated that drawings were to be sent in to the gallery at South Kensington Museum on or before the 4th June. Mr. C. BARRY reminded members that the

Institute had again been intrusted, by the Royal Commissioners, as in the case of the Paris Exhibition, with the management of the architectural sections of the exhibitions. Such a delegation of authority by the Royal Commissioners, who had set aside their own machinery for the purpose, was as creditable as it was gratifying to the members; and since the responsibility was great, he trusted the profession would fully avail themselves of the invitation to exhibit, and make the exhibitions successful as far as they were concerned.

Mr. HAYWARD asked what arrangements were made for the return of the drawings sent to Australia. Satisfactory arrangements seemed to be made for the Sydney exhibition, but he should like information as to the provisions for the safety of the drawings when sent from Sydney to Melbourne next year, and their return. The PRESIDENT explained that the Royal Commissioners undertook not only to forward but to return all drawings intrusted to them, and also to insure them against injury or loss. Mr. HAYWARD further inquired whether drawings sent for the first exhibition would also be necessarily sent on to Melbourne, for some exhibitors might not be willing to spare their drawings for so long a period. The PRESIDENT replied that if any such condition were made by an intending exhibitor it would be considered by the Royal Commissioners, who could of course accept or reject their drawings in consequence.

The SECRETARY mentioned that an exhibition of sanitary appliances is to be held at Cork in connection with the meeting of the British Medical Association from the 5th to the 8th August next. He also read a letter from Mr. W. W. Pocock, stating that the remaining portion of a building belonging to the Carpenters' Company, in London-wall was about to be removed. It contained some Tudor work, and a ceiling probably painted by Wren and his assistants; the hall would be open to the inspection of members until it was pulled down. The PRESIDENT remarked that Professor Donaldson had given the Institute an autograph of Wren's, to be added to his design for St. Paul's hung on the stairs. Mr. JOSEPH CLARKE said some effort ought to be made by the Carpenters' Company to preserve this Tudor and Jacobean work, either by building it into the new hall or by keeping it therein. There was not room to receive it at the Architectural Museum, or it might have been exhibited there. On the suggestion of Mr. Barry it was agreed that a letter be written in the name of the council asking for measured drawings of the old work, to be added to the Institute collection.

PROPOSED PORTRAIT OF THE EX-PRESIDENT.

Mr. JOSEPH CLARKE referred in eulogistic terms to the mode in which Mr. Charles Barry had discharged the duties of President, stating that looking back as he could to the days of Earl de Grey, he had never known the chair so well filled. He suggested that Mr. Barry be asked to allow his portrait to be painted, and that the members enter into a subscription for the same, in order to present it to the Institute as the first of a series of such portraits. Mr. CLARKE concluded amidst applause, by moving a formal resolution to this effect. Mr. C. F. HAYWARD seconded the resolution, and suggested that the portrait should correspond in size to those of Sir M. D. Wyatt, Mr. T. H. Wyatt, and Sir G. G. Scott. Mr. O. HANSARD wished the resolution so to be altered as to state that the portrait was one of a series; but Mr. WATERHOUSE, A.R.A., deprecated this, remarking that for an ex-president to have his portrait presented to the Institute ought to be regarded as a very great compliment to him; it might happen at some future day that they would not care to have the portrait of an ex-president. Mr. CHATFIELD CLARKE expressed a hope that a thoroughly good portrait would be secured, which would be at once a credit to Mr. Barry and to the Institute. The resolution was carried unanimously, and Messrs. Joseph Clarke, C. Foster Hayward, and Horace Jones, were appointed hon. secretaries of the subscription fund.

BILLS OF QUANTITIES: THEIR PROPER RELATION TO CONTRACTS.

Mr. JOHN HONEYMAN, of Glasgow, read a paper on this subject, the first portion of which will be found on our next page.

At its conclusion a discussion took place, opened by Mr. WYATT PARWORTH, who inquired

as to the character of the education of a valuing surveyor in Glasgow.

Mr. ARTHUR CATES expressed his thanks to Mr. Honeyman for the able manner in which he had introduced the subject, and for the strong originality with which he had treated it. He thought, however, the lecturer had not sufficiently weighed the importance of his remarks in reference to the measuring surveyor and his honesty of purpose. It was true that his remarks had been subsequently toned down and explained, but he (Mr. Cates) thought that they should be somewhat modified before they appeared in the Transactions. It had been suggested in the paper that the measuring surveyor might increase the quantities to a considerable extent, thus benefitting the contractors at the expense of the proprietor for the sole purpose of increasing his percentage. "The surveyor and the contractor alone," Mr. Honeyman had said, "were benefitted by the quantities being excessive; every penny unnecessarily added to the contract price was a direct gain to both." That the inducement of getting 30s. for every £100 added to the cost would be powerful enough to lead the surveyor to increase his quantities it was certain was incorrect, and he hoped Mr. Honeyman would modify the assertion. The author had seemed to infer that the taking out quantities was, under the old system, done without cost to the proprietor. This was a very great delusion, as the contractors always put down in their tenders the cost they had incurred in estimating the quantities. The change was made in order that this cost should only be incurred once by all those who tendered, and so that each should obtain accurate quantities. Again, the London system had hardly been accurately described, for it had been inferred that the proprietor had no equivalent for his quantities. Certainly he had a most complete and thorough equivalent, for assuming, as one must do, that the quantities were properly prepared, all the contractors were placed on an equal level and a correct basis on which to make a tender. The experience of Mr. Honeyman seemed to have been very different to that he had himself met with. If a surveyor were a competent man, he could not see in what manner extravagant cost would be involved in his taking out the quantities. An illustration had been adduced where the same contractor obtained the contract for adjacent buildings by the same architect and afterwards claimed to be paid by both proprietors for the party wall, on the ground that it had been shown in both sets of quantities. In this case the architect and surveyors must have been very negligent to allow the contractor to be able to claim for work which he had never done. At the first General Conference of Architects in 1871, this question of quantities was introduced by Mr. T. H. Wyatt, and a special committee was appointed to consider and report upon it. They drew up a list of questions as to the taking out of quantities and the employment of surveyors, which were forwarded to members of the Institute. Some sixty replies were received to these inquiries, and the committee made a report at the Conference in June, 1872, in which they stated that, for the present, they were satisfied that it would not be practicable to lay down any fixed rule for the guidance of the architect in dealing with "quantities." The committee added that "it would appear reasonable" that the bills of quantities which express in an exact form the intentions of the architect as set forth in his general drawings and specifications, ought to form a part of the contract, and be dealt with as a recognised exposition of the responsibilities of both employer and builder. The system adopted by many eminent architects, of nominating a surveyor who should prepare quantities on his own responsibility, which quantities became a part of the contract, might, in cases where time pressed, be advantageously adopted, provided that the builder be relieved from responsibility as regarded the quantities. Where the architect supplied the quantities for carrying out his own designs, it should be with the knowledge and concurrence of the employer, and the quantities should form a part of the contract. This report was received by the Institute. In 1874 the subject was again referred to this committee, who reported back that they found no reason for modifying their conclusions, but they could not submit any more definite proposal to the members. He thought Mr. Honeyman's scheme for measuring and remeasuring when the building was erected would involve increased

chances of error, and great delay in the final settlement of accounts, and while agreeing in the recommendations of the special committee, he saw no grounds for any change in the London system.

Mr. C. BARRY said Mr. Honeyman had gone on totally false premises, as far as the London system of contracting was concerned, in supposing that a single surveyor was appointed, and that by the architect. The custom invariably adopted was for two surveyors to be appointed—one by the architect to take out the quantities, and the other by the builders to see that he is justified in his estimates. Cases had occurred where there was that trust felt in the choice made that one man acted for both parties, but it was by mutual consent; the architect had the power to choose, and the builder to refuse his services. He could not imagine any more fair system than this could be devised, and it was one which had the enormous advantage of affording an opportunity to the client to ascertain as far as possible the cost from the outset. Mr. Honeyman appeared in his paper to have set up giants of his own imagining for the purpose of knocking them down. He had, indeed, charged surveyors with being the servants of the contractors and so having an interest in taking out the measurements very fully. Such a statement as this ought hardly to be made and published under the authority of the Institute. It was not true of surveyors as a body, who would not do anything wrong wilfully, although being human they were liable to make mistakes. He agreed with Mr. Cates that mistakes would be more likely to occur if the measurements were made on the buildings than on the drawings in the quiet of an office. Mr. Honeyman had also said that formerly the experience of those tendering came into play as a safeguard against excessive cost, but that now that the amount of tenders turned on the mere variety of rates, architects must either guarantee the accuracy of the quantities or arrange for securing the interests of the proprietor in spite of errors in those. He forgot that an honest difference in the amounts of tenders on the same quantities depended not alone on the relative rates of profit, but on the amount of capital invested in the business, the occupation of the builder's staff, his stores of material, or some foreseen change in market prices. Again, if the quantities were systematically too high, the contractor would not be able to depend on them in tendering. The pecuniary responsibility of surveyors had been treated in the paper in a scornful manner, but this was not such a shabby guarantee as had been suggested. He had known cases where surveyors who had made serious omissions had paid the contractor's charges without demur, although in some cases the proprietors had not recouped them this payment for work of which they received the sole benefit. In parts of the paper he cordially concurred, although he considered his case as a whole had completely failed, and he would conclude by moving a vote of thanks to Mr. Honeyman.

Mr. ALFRED WATERHOUSE, A.R.A., remarked that, in describing the Glasgow system, Mr. Honeyman had not told them what it cost—a most important point. Although the paper would be useful in leading members to think more seriously of the quantities question, he did not think the author had hit the nail on the head. The system practised here was very anomalous, in employing a surveyor to prepare quantities for the contractors, and yet not taking the results of his labour as a basis of contract; and if architects could persuade clients to allow this to be the case many of their difficulties would be at an end.

Mr. RICKMAN differed from Mr. Barry in the opinion that the system most largely adopted in London was that of employing two surveyors. It was becoming more largely into vogue to engage but one surveyor (Mr. BARRY explained that he referred to the employment of one surveyor by mutual consent), but in very large buildings there were obvious advantages in engaging two professional men. The surveyor should, he thought, be kept as far as possible free from pecuniary responsibility. Under the old system which prevailed in London a generation ago, every item was measured up, and the whole was most difficult of variation. In the present mode of measuring up it was easy to allow for alterations as the design progressed towards execution. He thought measuring surveyors of London would hardly care to become licentiates of the Institute, as suggested

by Mr. Honeyman: they would, he trusted, take a much higher position than that.

Mr. CHATFIELD CLARKE observed that Mr. Honeyman had not given any data as to the cost of his proposed system of measuring. He should himself studiously avoid making quantities part of the contract.

The PRESIDENT, in putting to the meeting the motion of thanks to Mr. Honeyman for his exhaustive paper, regretted there had not been more time for the consideration and discussion of this useful and practical subject.

Mr. HONEYMAN, in reply, acknowledged the hearty manner in which the vote of thanks had been accorded. He regretted his references to the relative positions of measuring surveyors and contractors, alluded to by Mr. Cates, should have been capable of being misunderstood; if they appeared to cast any imputations upon either he should be most anxious to modify them. What he had intended to show was that the surveyor was responsible to the contractor, and that this was a wrong position in which to place the two parties. To say that the surveyors would knowingly increase the amount of the contracts for the sake of the additional percentage was no more reasonable than it would be to accuse architects of a similar desire to increase the cost to clients. It must be remembered that he was not only referring to the better class of surveyors, who were incapable of such practices, but to the whole body of surveyors throughout the kingdom. As to contingencies, in the Edinburgh system there was always a separate item for these. As to the London system he had thought that but one surveyor was employed, and that by the architect with the consent of the contractors. Allusion had been made to the case where an Edinburgh contractor claimed to be paid twice for the same wall, but he ought to have said that in that case the contractor considered he was aggrieved by other omissions, and wished to set it off or to have the work re-measured. The cost of the Glasgow system varied according to the character of the work. A great deal of the work was measured and re-measured for from $1\frac{1}{2}$ to 2 per cent., i.e., for both operations, but the majority of it probably cost for both measurements $\frac{2}{3}$ per cent. on the total cost, and it was found that the better class of Glasgow surveyors took out the quantities with almost absolute accuracy. His main argument, however, had been that bills should be made the basis of the contract, and he still believed this could best be done by the process of measurement and re-measurement.

BILLS OF QUANTITIES: THEIR PROPER RELATION TO CONTRACTS.*

THE modes of measuring artificers' work vary considerably in different parts of the country; and, still more markedly, in other matters connected with contracting the practice is diversified. In some localities the quantities are taken out by a special class of men variously styled quantity-surveyors or measurers, in others by architects; in some they are taken out with the greatest minuteness and with elaboration of detail, while in others the descriptions are general and comprehensive, and the contractor is obliged to interpret the details for himself; in some it is customary to base the contract upon the plans and specifications alone, while in others the practice so greatly differs that the contract is based upon the bill of quantities alone, and there is no such thing as a specification referred to at all. In these circumstances it is extremely probable that defects exist in many, if not in all, the methods of contracting for buildings now generally in use, and it is perhaps equally probable that each of the various methods possesses certain merits peculiar to itself, or more or less common to the other. An earnest and unprejudiced investigation into these peculiarities, then, cannot fail to be interesting and profitable; and I am sanguine enough to hope that it may lead to the conviction that the construction of a system superior to any of those now in use is not only desirable but practicable. It is with the desire that I may be able to assist, however feebly, towards the realisation of such a consummation that I now address you.

Before proceeding to consider the various modi-

fications which have been made, or which ought to be made, in the relative positions of building owners—or proprietors, as I shall call them—architects, surveyors, and contractors, I wish to direct your attention very specially to the elementary truth, which we must never lose sight of, that in contracting the normal state of matters is this: the architect having completed his plans and specifications occupies in relation to the contractor exactly the same position as his client the proprietor, who might in point of fact get in tenders himself without the further intervention of the architect. It is generally convenient for the proprietor that the architect should get in the tenders for him, but in doing so the latter, if he has followed his employer's instructions and represented what is wanted by sufficiently explicit plans and specifications, incurs no other responsibility. He has nothing to do with the means which the builder may employ to ascertain the value of the work. One builder may measure the work himself, another may get some one to measure it for him; one may have it minutely measured, another may do it roughly, or even guess what the value should be. All the proprietor, or his agent, the architect, wishes is an offer *bona fide* for the execution of the works he has illustrated and described. That, I say, is the normal relation of the parties in estimating. In these circumstances it is a matter of indifference to a proprietor or his architect what quantities of materials a contractor uses, so long as he executes his work satisfactorily in accordance with the plans and specifications; the onus of ascertaining how to do this at the smallest cost rests upon him, and competition with others effectually keeps him from careless or wilful exaggeration. This responsibility was in former days fully accepted by contractors, and men who understood their business thoroughly had no difficulty in tendering without the intervention of a third party; moreover, they enjoyed a distinct and legitimate advantage over others who were less competent or experienced, the tendency of which was beneficial in many ways. Now, however, so great a change has occurred in this respect that it would be extremely difficult to find in any locality contractors able or willing to tender for a work of any importance without bills of quantities. The present generation of builders has become accustomed to them, and it may be safely said that many could not give an intelligent offer without them. The normal arrangement, as I have called it, is henceforth inapplicable, and it is generally admitted that it is impossible now, even if it were thought desirable, to return to it. But, and this I wish particularly to emphasise, it by no means necessarily follows that the change in the practice of contractors should affect in the slightest degree their proper relation to proprietors. The change has been introduced primarily to facilitate the work of the contractor, but the proprietor may and ought to share in its advantages. There is evidently something radically wrong if its effect is to lead the proprietor with expense and responsibility for which he has no equivalent; and it is the duty of the proprietor's architect—or, speaking for proprietors generally, I may say it is the duty of this Institute, to see that we do not drift into the use of a system which must produce such results. This duty is, I think, brought home to us forcibly by the following among other considerations:—First, and most directly, because it is the proprietor who has to pay for the surveyor's work. In some cases this payment is made wholly or in part through the contractor; but in every case it comes out of the proprietor's pocket either directly or indirectly, whether he realises the fact or not. In one shape or another it is a charge which the proprietor must bear, and it is therefore clearly the duty of the architect in the interest of his client to see that the money is judiciously expended and that a fair equivalent is obtained. A second reason why architects should now devote special attention to this subject arises out of the circumstance that in times past they have too much neglected it. They have failed to control the development of the system which as it exists is eminently unsatisfactory—especially for proprietors—although regarded by our profession with a complacency or indifference which seems to me, I confess, astonishing. A third reason for their more active interference is that they may control the further development of the system, and by their united action counteract tendencies which are mischievous, confine the measurer to his legitimate province, and fully

* A paper read by JOHN HONEYMAN, F.R.I.B.A., of Glasgow, before the Royal Institute of British Architects, May 19th, 1879.

utilise his work for the benefit of the proprietor, who pays for his services. Of course, as we shall afterwards see, such a course is not incompatible with due consideration for the interests of the contractor. He is, and the quantity-surveyor ought to be, directly under the control of the architect, who is no more likely to act unjustly to the one than to the other.

Before suggesting some changes which I think would be advantageous, it will be necessary to refer at some length to the existing systems in different parts of the country, and to examine critically the special features of each which bear upon our subject. I have therefore arranged my remarks under the three following heads:—First, the actual state of matters; second, a critical examination of the prevailing systems; third, proposed changes.

I.—The first of these need not detain us long, because the members of the Institute already know a great deal about it. You are all familiar with the modes of measuring and contracting in some localities, and many of you have had experience in all parts of the country from Land's End to John O'Groats. I must, however, for future reference state succinctly the distinctive characteristics of the systems now generally recognised. First, and by far the most extensively practised, is that to which you are accustomed here in London. In your practice the bills of quantities, or the "Schedules"—as we call them in the North, and I think the term is more convenient—after they have been issued are practically ignored by the architect. They are, whether prepared at the instance of the contractor or under the direction of the architect, regarded simply as aids to the contractor in arriving at an intelligent idea of the cost of the works, and it is the exception when they are still further utilised as guides in fixing the cost of additions and deductions. Formerly, and not many years ago, it was usual for the contractors to choose the surveyor, and in works of considerable magnitude a second surveyor was employed by the proprietor as a check upon the other. This cumbersome and expensive system is still occasionally adhered to, but it is rapidly losing favour and even now may be regarded as exceptional. As a rule now the architects, acting as the proprietors' agents, select surveyors in whom they have confidence, whose bills of quantities are generally accepted by contractors as a safe guide. But, strange to say, the architects have failed to recognise the fact that this interference on their part necessarily alters the relation of the schedule to the contract, and they still assert that it has no relation. It is therefore ignored; the proprietor is supposed to have nothing to do with it, and an attempt is made to free him from responsibility by a legal fignment—the arbitrary transference of the surveyor's services to the contractor at a certain point.

With slight modifications, which for our present purpose it is immaterial to mention, the London system is followed throughout England and Ireland; but generally the interference of the architect is carried a step further in the Provinces; he does not select a surveyor to take out the quantities, but he takes them out himself, thereby incurring serious responsibilities over and above those which his position as an architect necessarily entails; in fact, he becomes responsible both to the proprietor and the contractor, an anomalous and dangerous position. Both in the London and the English provincial practice the surveyor is paid by the contractor, unless there is an express agreement to the contrary.

The Edinburgh system resembles that of England in many respects, the principal differences being these: First, contractors never have anything to do with the selection of the surveyor or measurer, as he is called, who is always employed by the architect. Second, the measurer is paid by the proprietor. Third, the schedule is referred to in the contract. It is lodged with the architect with the various items cashed and summed up, and the rates contained in it regulate the cost of additions or omissions which may be ordered in the course of the work. It is also a useful guide to the architect in certifying for instalments. A somewhat similar arrangement is sometimes made in England and Ireland, but in these cases the priced schedule is generally lodged under seal, and even with this modification the practice is by no means common. There are some other shades of difference in provincial practice, but no other system is sufficiently distinctive to merit notice except that which

prevails in Glasgow and the West of England. In Glasgow the schedules have superseded the specification altogether, and it may almost be said that a specification is never referred to in the contract at all. The architect selects the measurer, who, with the aid of the drawings and specification, or such substitute for that as he may get, prepares a detailed schedule of quantities. Copies of this are issued by the architect to selected tradesmen, who are invited to tender by a certain day. These schedules are returned to the architect with rates filled in at each quantity, the amount extended, and the total summed up at the end. A letter accompanies, or more generally is attached to, the schedule, in which the builder offers to execute the work in accordance with the drawings, and "to the extent of the schedule" for the sum brought out by the addition of the extended prices, it being further provided that the whole of the work shall be measured after it is finished, and whether it turns out to be more or less than estimated the cost shall be determined by the rates contained in the schedule; or, where these do not exactly apply, by others strictly in proportion to them. Having considered the various offers, the architect writes on behalf of the proprietor accepting the one which is preferred, and that completes the transaction; in nine cases out of ten there is no more formal contract. When the work is in progress, and when it is finished, the measurer measures it, and prepares a final measurement applying the schedule rates to the various items, and so bringing out the total sum to which the contractor is entitled. This document is examined by the architect, and if he is satisfied that it is compiled in accordance with the estimate he signs it as a final certificate. Half of the cost of the original schedule and subsequent measurement is deducted from the contractor's accounts, and the proprietor pays the full amount—that is ostensibly the half, but in reality the whole. In the East and North of Scotland the Edinburgh system is more or less closely followed, while in the West the Glasgow system prevails; the principal difference in the smaller towns being that in most cases the architects prepare the schedules themselves instead of employing measurers.

From the foregoing brief account of the existing state of matters, it will be observed that, leaving out of account the now comparatively rare cases in which no quantities are supplied, there are three distinct modes of estimating in common use, in each of which the schedule or bill of quantities occupies a different relation to the contract. In the first the actual contract is independent of it, and its only use is to enable men to form a correct estimate of the sum for which they may prudently contract. In the second the schedule is supplementary to the contract: it is a sort of appendix regulating the modification of the contract in certain contingencies, and also supplying the architect with information which is very useful to him during the progress of the work. In the third the schedule is the contract to all intents and purposes. Now as these three modes of estimating have been in use for many years in the largest centres of population, we may reasonably expect by careful consideration of their working to obtain some useful lessons, and this none the less although we may be compelled to regard the existing state of matters as upon the whole unsatisfactory—the existing diversity itself, indeed, is unsatisfactory.

(To be continued.)

THE PAINTED CEILINGS AT ST. ALBAN'S.

WITH reference to the appeal on behalf of the painted ceilings at St. Alban's by the Society for Protecting Ancient Buildings, referred to in these columns last week, Sir Edmund Beckett writes that if the "Society" will take the trouble to read the reports of their own architectural partisans last November or his summary of them in the *Times* on Christmas-day, they will find their secretary's questions fully answered. If they do not choose to do that and to learn what the 'painted' ceiling was which alone is meddled with both in art and substance, they will attend to no further answer now. At any rate, they will have none from the committee."

The Hon. Secretary to the Restoration Committee writes that the letter of Mr. T. Newman Marks shows beyond all doubt that he has not

taken the trouble to come down to inspect the painted ceilings and to see for himself what the committee have really done. "He would find the exquisitely-formed ceiling over the choir of the time of Edward I. has simply been cleaned from cobwebs and dust, that the richly-painted ceiling over the nave as far as St. Cutbert's screen has been most judiciously restored on the old lines, to the delight of all who behold it, and even what remains of the, comparatively speaking, modern distempered ceiling over the rest of the nave (which is not actually rotten) will be retained by Mr. John Scott."

Mr. J. O. Scott writes: "Should Mr. Marks happen to visit St. Albans a few months hence, when the works now in progress are completed, he will, I hope, be gratified to find his wishes on behalf of these ceilings carried out; but he must not on that account take any credit to himself for 'intervening,' for there has never been any intention of destroying them. There are two divisions of the nave ceiling, the whole of which is flat in design. The eastern part, occupying about a third of the length, is panelled, and is very beautiful; but it is well to bear in mind that its beauty is mainly due to the careful restoration of its ancient painting carried on about three or four years ago, this having till then been concealed by some poor caricature of it done in modern times. This fine ceiling will be scrupulously preserved; there has never been a thought of anything else. Probably its panels, which are movable, will be taken down during the work to insure their safety. The western part is not so good. It is quite plain, without panels—in fact, like a wooden floor reversed. A resolution was passed some months since to restore it in oak, using as much of the old boarding as possible; and the contractor has framed his estimate in accordance with this. I fear the proportion of new wood will be very large, the bulk of the boards being of modern deal, and the rest grievously rotten. The intention is to keep as much as we can, but of course we shall only replace the unsound wood. The painting of this part of the ceiling is excessively rude, but turns out to be a rough copy in distemper of the original decoration which we find underneath, and which will be restored, as has been done with such good results in the eastern part. I am sorry that Mr. Marks should call our new roof an 'uncouth monster.' In one sense, the cathedral itself is a monster, and its covering must be in proportion; but if this very straightforward, high-pitched roof, covered with respectable lead, is, in his opinion, 'uncouth,' so must also be those at Westminster, at Salisbury, and at Lincoln; so that, as far as this is concerned, the committee and the public may safely retain their peace of mind."

CHIPS.

The east window of the north aisle of Woburn Church, near Newton Abbott, has been filled with stained glass. The four principal lights are occupied by two tiers of subjects, the upper series illustrating the miracle of the "Raising of Life of Jairus' Daughter," and the lower series the "Raising of Lazarus." The tracery lights, contain a representation of Christ with outstretched hands, regarding His adoring followers, who are placing their crowns at His feet. The work has been done by Mr. F. Drake, of Exeter.

On Friday morning an inquest was held at 30, Thurlow-road, Hampstead, on the body of Mr. Horace Field, aged 56, architect, and district surveyor for Putney and Roehampton, who expired suddenly at his residence on the previous Wednesday. The evidence of Dr. H. Cooper Rose, who had made a *post-mortem* examination, showed that death resulted from fatty degeneration of the heart, and a verdict to that effect was returned by the jury, of which Mr. Carl Haag, the artist, was foreman.

A new chancel and organ-chamber are being added to the church of St. James, Preston, from the designs originally prepared in 1869 by Mr. Hibbert of that town. The chancel is 25ft. wide by 42ft. to apsidal east end, and the organ chamber is 19ft. by 12ft. Longridge stone is used for facings, and in the chancel will be a memorial stained-glass window to the late Alderman Spencer. The contractors are, for masonry, Mr. Lamb; woodwork, Mr. Bamber; glazing and painting, Messrs. Walsley and Co.; and plastering, Mr. K. White. The cost will be £2,500, exclusive of permanent fittings and new pulpit, lectern, and stalls.

The Tyndale Memorial Committee have intrusted to Mr. J. Edgar Boehm the design and erection on the Thames Embankment of a statue of William Tyndale.

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ILLUSTRATIONS.

NEW PREMISES, 57, NEW BOND-STREET.—"DYBDALE,"
WELLINGBOROUGH.—UNIVERSITY COLLEGE, BRISTOL.—
SCREW SCAFFOLDING.—ST. PAUL'S CHURCH, MAN-
CHESTER.

OUR LITHOGRAPHIC ILLUSTRATIONS.

157, BOND-STREET.

ONE of the most conspicuous drawings this year at the R.A. is that of the above building, of which Mr. Robert W. Edis, F.S.A., is the architect, and we are enabled to reproduce it to-day for the benefit of our readers. The execution of the work was conducted by the proprietor, under Mr. Edis's supervision, and much care has been taken to carry out the architect's designs for the whole of the work, including some costly carton pierre decorations to the large picture gallery at the rear of the premises. This work, and also the mantels, were executed by Messrs Jackson and Son, of Rathbone-place. The carvings throughout are the work of Mr. Frampton, of Camberwell. Besides the Royal Academy perspective we include in our illustration a section of the front.

DYBDALE, NEAR WELLINGBOROUGH.

THIS house, now nearly completed, is built of red Berkshire bricks, with Staffordshire roofing tiles. The whole of the internal fittings, including fireplaces, &c., have been made from special designs prepared by the architect, Mr. W. Talbot Brown.

UNIVERSITY COLLEGE, BRISTOL.

A FEW weeks since we published a double-page view of Mr. Stuart Colman's larger design for the new University College proposed to be built at Bristol. We then gave a general description of his plans, and to-day we illustrate Mr. Colman's smaller design, of which he has sent us the following particulars:—The two-story building consists of a broad central corridor, with the council-room, principal's, professors', secretary's, and men's reading and cloak-rooms opening conveniently from it. It leads on the right to the large lecture-room, which fills the right wing, and forms a prominent feature from the S.W. approach. The small lecture-rooms not requiring apparatus, and the women's reading-room, are placed upon the upper floor. Owing to the rapid slope of the ground, beneath the large lecture-room accommodation is secured for the physical and engineering rooms, opening on to the lower level of the quadrangle, or reached by a staircase contained in the tower on the right hand.

TOWER AND SPIRE, ST. PAUL'S CHURCH,
MANCHESTER.

MR. JOHN O. SCOTT'S only exhibit at the Royal Academy this year is the drawing which we reproduce to-day of the tower and spire of St. Paul's Church, Manchester. The original design for this church included a tower and spire, but this feature has been considerably enlarged upon since the first plans were made, owing to the munificence of a lady who has borne the greater part of the cost. It was finished some few months since, Mr. Collins, of Tewkesbury, having been the contractor. A peal of bells will shortly be arranged in the tower. The drawing is by Mr. Samuel Weatherley. We gave a view of the west front of this church on September 10th, 1875, and another of the interior on September 7th, 1877.

SCREW SCAFFOLDING.

For a description of this illustration see article on p. 581.

FURNITURE AT THE YORK FINE ART
AND INDUSTRIAL EXHIBITION.

IN the BUILDING NEWS of the 9th inst. you gave an account of the opening of this exhibition. I now send a few notes on some of the furniture and kindred exhibits, which are not only numerous in quantity but excellent, as a rule, in quality. On each side of the main hall of the permanent building are arranged buffets of various makes. The first on the right upon entering, is contributed by Appleyard and Sons, of Rotherham. It is of pollard oak, simple and effective, some of the mouldings being stained black. In the back are three panels, painted on a gold ground, with birds and flowers, emblematical of morning, noon and night. Another buffet, also of oak, larger and more profuse in ornament, is exhibited by same makers. The panels of cupboard doors are carved with wheat-ears and grapes, and the back of the upper portion is lined with stamped leather in sage green and gold. There also are painted panels, the largest, at the top, being a hunting scene. The side of a room in Jacobean style, with a buffet and two chairs, are exhibited by Messrs. Marsh, Jones, and Cribb, of Leeds. The mouldings of the buffet generally display much taste, but the panel bearing five female figures in Greek costume is not quite so happily executed as it might be. The next side-board is of a thoroughly different character. The style is a kind of French Renaissance; the parts are few and massive, and the carving is very naturalistic, and in full relief. The doors of the lower portion bear heavy bunches of game. Three large mirrors form the back, the centre being separated from the side ones by female figures, the one holding a bow and the other a fishing-rod, but are not very high specimens of figure-carving. The buffet of Mr. John Taylor, of York, is better worth notice. The arrangements are simple, carving conventional and in low relief. The back is enlivened with panels painted with flowers and buds, upon gold grounds. Crossing the hall is reached a lectern by Harry Hems, made from an oak beam taken from Salisbury Cathedral, the most important feature being four angels with outspread wings in various attitudes of devotion, ranged around the stem of the lectern. The foliage carving is executed with good taste.

The next article of furniture is a cabinet in rosewood, designed by H. W. Batley, and exhibited by Messrs. Ogden and Son, of Manchester. It was awarded a silver medal at Paris last year. It is Jacobean in style with a few traces of Japanese influence, which is characteristic of most of the works produced by this firm. There are no broad surfaces, the whole thing is broken up into small cupboards and shelved recesses with a projecting, quaint, glazed receptacle in the centre of the upper portion, and every part is covered with moulded, carved, or painted ornament.

James Lamb, of Manchester, has an important show. There is a dining-room buffet in brown oak, with chairs of various designs, and panelled wood ceiling for a dining-room. The section appropriated to drawing-room furniture contains two chiffoniers, a what-not, occasional table, &c., which are mostly elegant, but have no special features demanding attention. The side-board exhibited by Messrs. Simpson and Son, Halifax, is fussy in design and of no particular style. The Gothic cabinet, in old English oak

(Mr. J. Lumhey, Leeds), is more quaint than beautiful. The candlesticks are peculiar, being on the one side a bone, at which an uncomfortably-seated dog is looking, and on the other a bit of branch, explored by a mouse, who occupies the attention of an uncomfortably-seated cat.

In the galleries of the temporary building are various compartments devoted to furniture, decoration, &c. Several of those on the south side are not yet fitted up. On the north side a compartment, rather gloomy-looking, is filled with church furniture and fittings, mostly designed and executed by Mr. Knowles, of York. The entrance, formed of organ-pipes, is heavily draped. The light is obtained from three openings filled with stained glass, which form the most interesting portion of the exhibits. The centre light is occupied with a figure of St. Cecilia, seated at an organ in a very constrained attitude, but otherwise well drawn, above her being a small choir of angels. The other lights are Renaissance in style, and adapted to domestic work. The middle portions are occupied respectively with emblematic figures of music and painting. The exhibits of Messrs. Marsh, Jones and Cribb, are of domestic function, the best article being a chimney-piece in oak, refined Jacobean in style. Hunter and Smallpage, York, have various articles of bedroom furniture, of good, but not special, design. Three compartments are occupied by Hummerson Bros., of Leeds, who treat them respectively as a drawing-room, dining-room, and bedroom. The buffet in the first is as pleasing as anything in the exhibition; the design is simple and the mouldings delicate. The shelf of the mantelpiece is a great deal too massive. The bedroom suite in polished pine is generally elegant, but the chairs are not altogether satisfactory. The drawing-room has a very funeral aspect, the woodwork being ebouissed without any lines of gold or colour. The most pleasing article is the centre octagonal table, in Anglo-Japanese style. This compartment would have looked better without the door, which is supposed to be the entrance to it. The style is altogether out of harmony with the furniture, and is not beautiful in itself.

COMPETITIONS.

BLACKBURN.—In a limited competition for a new Wesleyan School Chapel, Blackburn, the Committee have selected the designs sent in by Mr. Miles Aspinall, of Blackburn.

IPSWICH.—Mr. Chas. Barry will visit Ipswich on Tuesday, Wednesday, and Thursday in next week, to inspect the 22 plans sent in to compete for the premium of 50 guineas, offered by the Corporation for the Post-office buildings, and to advise the committee as to their award.

SWINDON.—The School Board recently opened a competition for plans for the first school to be built, one for 250 infants, with a view to the selection of an architect to the Board. Twenty-eight architects took part in the competition, which has resulted in the appointment of Mr. Brightwen Binyon, A.R.I.B.A., of Ipswich, and architect to the School Board in that town.

The Bournemouth Improvement Commissioners received and accepted at their meeting last week the resignations of Mr. C. C. Creeke, consulting surveyor, and for many years town surveyor, and of Mr. G. R. Crickmay, town surveyor. These resignations were tendered in consequence of difficulties connected with the sewage and outfall works now in progress. The commissioners are threatened with litigation by Mr. Stickland, the contractor for the inland drainage work, and are apprehensive of being personally surcharged with £1,100, declared by the Local Government Board Inspector to have been wrongly paid to Sir Joseph Bazalgette.

At the Wesleyan District Conference at Manchester, last week, proposals were approved to erect new chapels, at Silverdale to cost £1,400; at Kirkdale, £5,220; at Llanwrst, £940; at Presteigne, £850; at Colwyn Bay, £1,945; at Rufford, £819; at Earlestown, £5,000; and at Blundellsands (iron) £1,146; also schools at Fairfield, £2,558; at Palmgrove, Birkenhead, £650; and at Penketh (enlargement) £105; minister's house, at Lancaster, £810; and organs at Leatherland, Cranmer circuit, and at Adlington, Chorley circuit.

The Duke of Bedford and Mr. Boehm, the sculptor, are about to present a model of the statue of John Bunyan, erected at Bedford in 1874, to the Baptist College in Regent's-park.



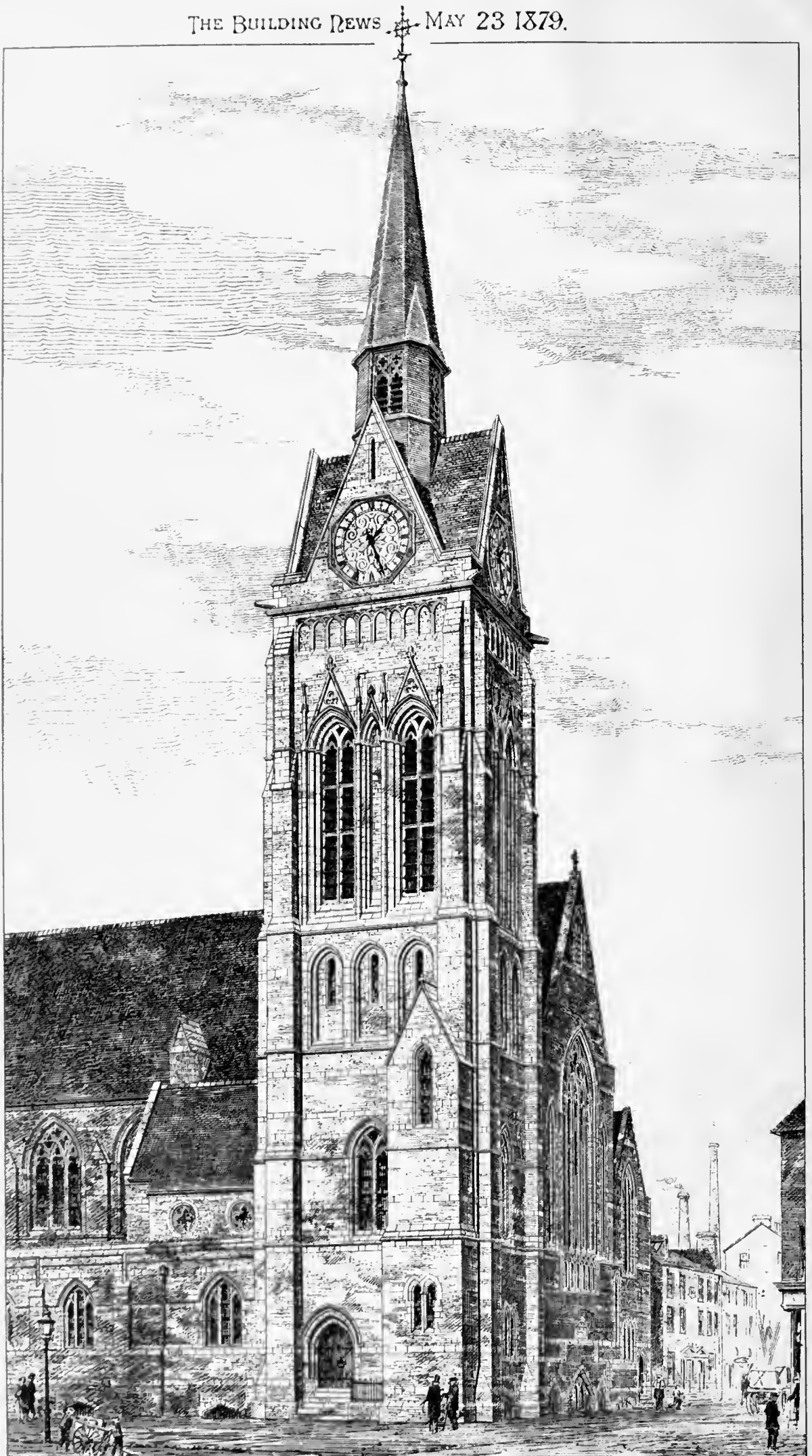
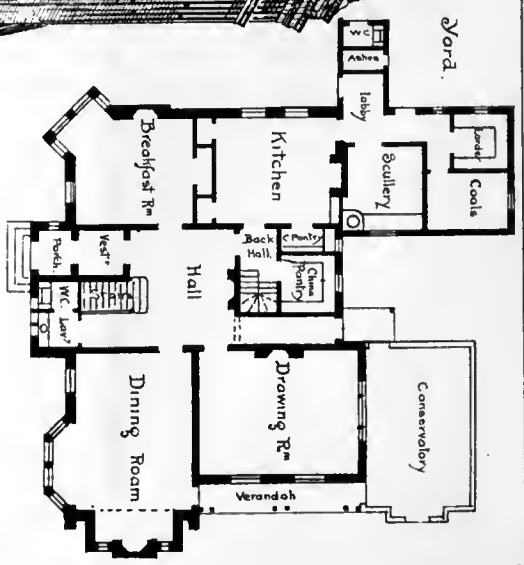
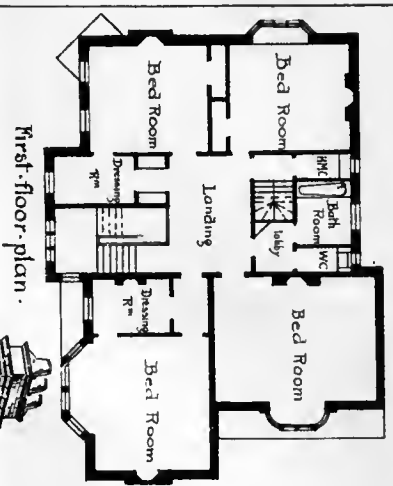


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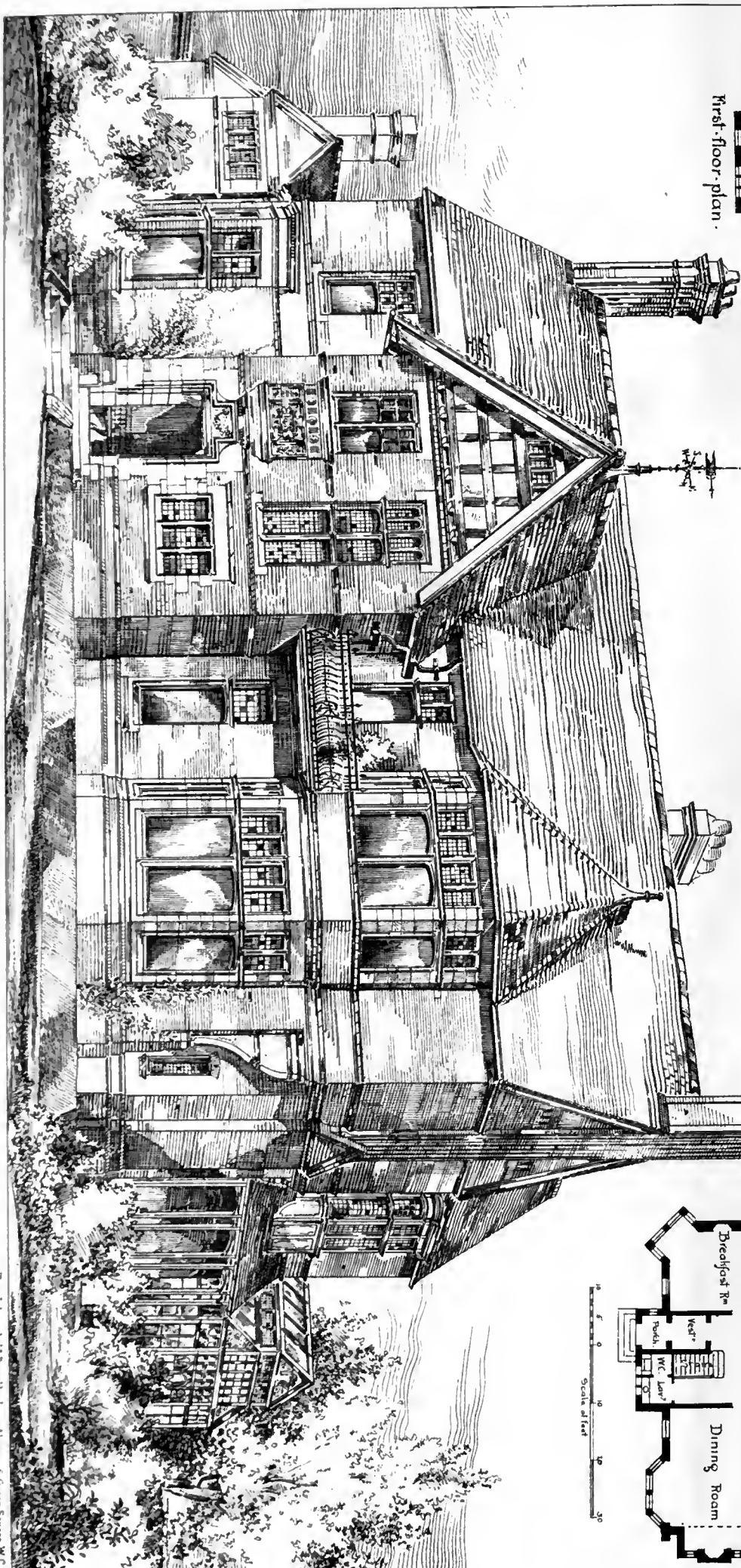
ST. PAUL'S CHURCH MANCHESTER. TOWER & SPIRE.



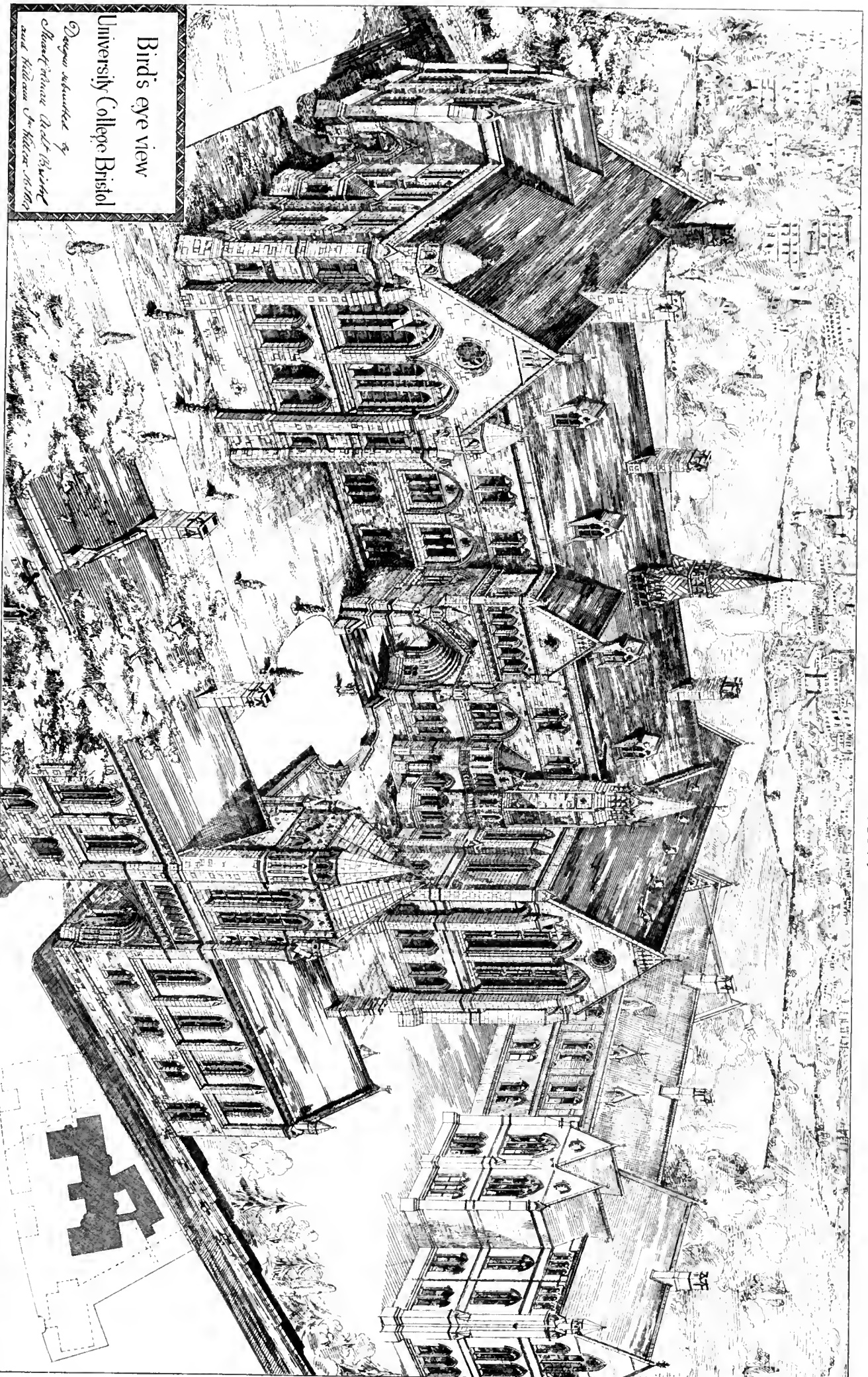
"Dybdale" Wellingborough. W. Talbot Brown ARCHT



Scale of feet



THE BUILDING JEWS MAY 23 1879.



Bird's eye view

University College Bristol

Designed & Illustrated by
Charles Francis Dicks (1879)
and William de Hillier (1879)

SCREW SCAFFOLDING.

THE following is a description of the scaffolding referred to in my letter on "Building Machinery," which appeared in the BUILDING NEWS of April 25th:—Fig. 1 (see Photolithograph) is a half-plan of, and Fig. 2 a section through the centre of tower, showing the screw scaffolding in position. A A are four scaffold screws, which bear the whole scaffolding of tower, one being placed in each angle of wall. Each screw is shown to work (see Fig. 2) through three nuts, B1, B2, and B3, and has a collar C, carrying a saddle D for the support of the ledgers E F and framing, from which the workmen's platforms, or scaffolds G, are suspended by wrought-iron slings, H. The wheels J of the bearers to outside scaffold travel up the face of the wall as the scaffold rises. Guard rails, K, are fixed where required, to insure the safety of the workmen employed.

In proceeding to fix the scaffolding, where the scaffold-screws are to work in the wall, all that is necessary is to place the screws A A in their proper position in the wall whilst the foundations are being put in, then plumb and build round them, clamping two of the nuts, B1 and B2, on each screw at the same level, and at the required distances apart. If 2' 6" of wall is to be built for each lift of scaffold, the nuts will require to be placed every 2' 6" in height. The screws should next be turned until all the saddles, D D, are standing on the same level; the overhead framing, ledgers, and platforms should now be placed in position, the nut B3 clasped on where shown, and the work of building from the scaffold begun.

If the platforms G G are placed about 12in. below the top of the wall then built, sufficient space will be left between the top nut, B3, and the collar C to allow of building up to the line of L, as required before raising the scaffold. The scaffold platforms will then be standing at about the best height for effective work, as the workman will, by such an arrangement, always be walling from just below his knee to about the level of his elbow, thus avoiding undue stooping and over-reaching.

When the 2' 6" of wall has been built all round, the workmen, whilst standing on their scaffolds, turn the screws A A (by a simple arrangement at the collar C), and raise the scaffolding, walling materials, and themselves as well, a height of 2ft. 6in. The foot of the scaffold screw will then have passed the bottom nut, B1, leaving it lying loose in the wall. This nut must then be drawn out of the wall (a hole opening to the inside being left for this purpose), and clasped on to the scaffold screw at the level of L, making it thus a top nut. When, after the next lift of scaffold, the foot of screw has passed up through nut B2, this nut, in its turn, is lifted up and made a top nut; and so on successively until the full height of wall has been built. It will thus be seen that a screw never rests in less than two nuts. As the screw by this system travels up with its scaffold, the same screws will do for any height of wall. There is no necessity to clear the platforms previous to raising. Before commencing to plaster the nut holes in the body of the walls are filled up, and the holes left by the screws are well grouted.

For "cleaning down" the work the outside platforms can be lowered as required from the projecting ends of ledgers.

The scaffolding screws can be used in three separate ways:—

- 1st. Working in the body of the wall.
- 2nd. Against one of the faces of the wall.
- 3rd. Independent of the wall.

Figs. 1 and 2 show the first method, where the screws are seen to work through the body of the wall.

By the second method the screws are supported on iron elbows projecting from one of the faces of wall, somewhat after the manner of No. 3 arrangement.

Figs. 3, 4, and 5 are a plan and side and back views respectively of uprights for supporting the scaffolds independent of the wall, as per third method. These uprights are made of three thicknesses of deal (bolted together from time to time as the scaffold rises), half-lapping as shown. When the scaffold platform has been raised to about the position indicated on Fig. 5, the upright is heightened by bolting on fresh lengths, as shown by dotted lines. M, M, are iron elbows bearing nut rests, N, N, which carry and keep the nuts, O, O, firmly in position.

When the scaffold has been screwed up the bottom elbow, with its nut-rest and nut, is taken off and raised to a higher part of upright, and so on, as in the case of screws working in the walls. The screws, in this case, can be turned by applying a handle to the top of screw, at P, by the workmen standing on the scaffold.

In the church where this system of scaffolding was employed, screws were placed in the aisle walls at Q Q (see Fig. 6) for the support of one end of aisle ledgers, the other end of ledgers, together with the whole of nave scaffolding, being supported by uprights, R R, fixed about 3ft. from nave arcading, to allow of working-space between the upright and the nave wall. When the walls of aisles had been built to their full height, the aisle ledgers were detached from the nave ledgers, and the nave scaffolding screwed up, stage by stage, for the construction of the nave arcading, clerestory walls, and gables. When no longer required for walling and roof-fixing purposes, this nave-scaffolding was used by the plasterer and the decorator. After first coating the ceiling, all that was necessary was to screw down the scaffold platforms, stage by stage, whilst the walls were being first coated, and screw them up again for the second and finishing coats of plaster.

Figs. 7 and 8 indicate how this system may be applied in the case of an ordinary building in a thoroughfare. S S are uprights for four screws, which, in this case, carry the whole scaffolding. Where the screws are placed at long distances apart, it may be necessary to truss the ledgers or scaffold-bearers, and where the builder wishes to work with a minimum number of screws, trussed bearers will naturally suggest themselves. To prevent the possibility of brickbats and building debris flying out into the roadway, I have shown a screen along the front of the building suspended from the scaffolding. This screen, which may be a kind of rope netting, will uncoil as the scaffold rises, see Fig. 8. If the whole of the material for a work of this kind is raised in the interior of the building, and the outside scaffold platforms used for the purposes of setters merely (and not for walling materials), there need be but slight inconvenience, and little or no danger, experienced by the street traffic whilst building operations are carried on.

As to the covering in of these scaffolds, reference to the sections will show that all that the builder requires to do for this purpose is to stretch tarpaulins or covers over such portions of the ledgers as will afford the necessary protection to the working platforms and walls. These coverings may be placed in position when the scaffolding is first fixed, as they add but little to the weight, interfere in no way with the raising operations, and go up with the scaffold without further attention or alteration.

There is no valid reason why the whole operation of building should not be carried on under cover, and the "waller" be placed in as good a position for doing his work as the "stonedresser."

The arrangement here applied to scaffolding could be made available for the extension of existing buildings by raising the roofs entire, and adding to the walls as the roof rose, in place of the tentative methods now resorted to when "roof-raising" is practised.

JOSEPH J. LISH.

MR. STREET ON THIRTEENTH CENTURY ARCHITECTURE.

AT the meeting of St. Paul's Ecclesiological Society, held on Wednesday evening, at the Chapter-house of St. Paul's Cathedral, the Dean Milman in the chair, Mr. G. E. Street, R.A., delivered the following address on "The Church Architecture of England during the 13th Century." Numerous photographs and plans were hung on the walls of the room, and the lecturer made on a blackboard rapid illustrative sketches of the sections of mouldings, the grouping of columns, and the traceries and cusping of fenestration as he proceeded. Mr. Street said:

In speaking to you this evening, I shall venture to assume that the object with which you are all gathered is simply that you may obtain some rudimentary information on the

subject of the architectural art of the 13th Century, and if in doing this I am almost too simple for some among you, I fear I may still be too technical for others. What I aim at doing is to enable you, as far as it is possible to do so in one short lecture, to realise for yourselves the cause of the development of English architecture in the 13th Century, and next to put you in the way of grouping and classifying the ancient examples which you are able to examine with some degree of precision and accuracy.

I confine myself to-night almost entirely to English architecture for several reasons:—

1st. It is ample for our time.

2nd. It is, I think, the best architecture of the period; and

3rd. It has such distinct characteristics as to make it necessary to treat it by itself.

In earlier times this was not so. Our earlier architecture was Roman in its origin; our Transitional still Romanesque in almost all respects; and in the 13th Century it was that architecture burst out with what was really a new invention—a new style.

One needs not to dilate on the 13th century and all its glories—the age of Dante and of the great group of Italian artists of all sorts who surrounded him, Giotto, the Pisani, Memmi, Buffalmacco, Arnolfo, and others; in France, the age of Philip Augustus, and of the grandest churches in that great country; in England, the period which is occupied by the reigns of John and Henry III., which saw the erection of Salisbury, Wells, Lincoln, York, Fountains, Whitby, Beverley Minster, and much of St. Alban's, not to mention others; in which Magna Charta was signed, and the foundations laid of all our subsequent greatness and prosperity; in which, finally, English art arrived at a perfection never since approached.

You have been told by a previous lecturer about the Transition. In it there was more respect for the past than hope for the future. The pointed arch was used because it was useful, not because it was liked. The problem in construction, which its use involved had not been realised or worked out. The art was essentially one of rest and quietness.

Amongst the reasons for the development of the new mode of building nothing was more important than the adoption of groining; when once this was introduced the builders perceived that the pointed arch was the best suited for their purposes. With the circular arch groining could be, and was used, but the junction of nave and aisle was awkward, the larger arches being necessarily stilted to suit the smaller ones, and the construction was weak. Thus it became almost essential that the arch should be pointed. Then the thrust of the arches had to be manifestly resisted, and this provision for thrust led to the introduction of the buttress, and the more scientific disposition of the masses.

Before the 13th Century all the principles of architecture were founded on Classical traditions. The arch, it is true, was used, but it was the arch at rest. It appeared to exert no lateral thrust. The piers were enormous, the walls very thick and no buttresses, and the weight and the thrust of superincumbent work was as weak as possible, distributed all over the length of the wall face. In the 13th Century all this was changed. Men discovered the real use of the arch. The pointed arch had been used in the East at a much earlier period. In Europe it was introduced and used in the latter half of the 12th Century; but only because it was convenient. How it came to be invented would in any case be a merely antiquarian question; but how suddenly the discovery of its proper use revolutionised our art, and that led at once to the invention of a new style is the real interesting fact in the whole history of architecture. All other styles may be said to have been slowly developed by patient steps, each being little in advance of the last. Here we have a sudden mighty change in the whole practice of the art following immediately on what was in truth as distinctly a discovery as are any of those great inventions which in our century have changed the whole current of labour in so many ways, as, e.g., the locomotive engine and the electric telegraph.

The 13th Century architecture is not in any proper sense a mere development. Its authors knew indeed what had been done in their earlier years and by their fathers. Their merit was that they realised at once in a practical way the proper consequences of the use of the pointed arch. What were these? (1) Weights were

gathered together, carried to the ground in part, and in part distributed by arches to other piers or buttresses. (2) Walls were no longer continuous masses of vast thickness. The wall proper was a thin connecting link between the buttresses which received the weight from above brought to them by arches and flying buttresses. (3) The construction was everywhere displayed. Men's delight in it made them show it; and henceforth the ornament followed the construction so closely as to make it almost a canon that all ornament should be used with a view to emphasising the constructional lines of the design. The result of these three principles or rules was, one may almost say, a necessary one. Architecture was, as it were, suddenly vivified. Where before all was at rest, suddenly an active life pervaded every stone. The building became almost as full of life as a human being. Each part had its work to do, and its shape, its position, its section was contrived expressly to enable it to do it in the best way. The essential difference between all earlier architecture and that of the 13th Century was, in a word, that in the latter there was from beginning to end thrust and counter-thrust in every part of the wall. From the base to the top of the highest pinnacle, every stone may almost be said to have had its work to do. Masons and architects had been skilful and able up to a certain point before. They had laboured to give decorative effect to their work by a profusion of carved enrichments; but they had known little, if any, scientific power. Within a few years the same men and their children have become transformed into workers so skilful and so scientific that every portion of their work has been touched by a warm breeze of refinement which presents us with the most delicately beautiful results that have ever been seen in the work of architects in any age. For, observe that all later changes were again, as before, merely developments. There is no difference in principle between 13th century and 14th, or between 14th century and 15th, and the only radical changes since the 13th century have been the determination of the Renaissance builders to forget that such a thing as a pointed arch had ever been constructed, and in our own days the determination of mankind in general that solid building of any sort was unnecessary, and that arches were inconvenient because they were in a sense costly.

To-night there is hardly time to occupy you with the question as to exactly when and where this great development arose; most of us would concur in allowing to France the greater share of the honour. In England one of the earliest examples of radical change in style is that to be seen in the choir of Canterbury Cathedral, the work of a Frenchman. But the distinctly French style of this church—the style of the Isle de France—had curiously little influence on architecture elsewhere in England. And there is more general likeness between the buildings of Normandy and England than between those of Normandy and the Isle de France.

Let us now go on to the examination of our subject in detail; and first, let us give a few dates. Most of the work embraced in this style was executed between the accession of King John in 1199 and the death of Henry III., 1272. Of the Temple Church, the choir was consecrated in 1240, in presence of Henry III. Of Westminster Abbey, the first stone was laid in 1245 of the choir and transcripts, and it was completed in 1269; Stone Church, Kent, and St. Mary Overie, Southwark, were completed about the same time; Salisbury Cathedral was built by Bishops Poore and Bridport 1218-1258; Wells Cathedral, 1225-39; York Cathedral, 1227-40; Fountains Abbey, 1205-46; of St. Alban's, the West end, 1195-1214; and the East End, 1257; and Lincoln Cathedral, 1232-35. Of this period about all the most exquisite of our abbeys are illustrations, as e.g.,—Netley, Beaulieu, Whitby, Rievaulx, St. Mary's, York; Lanercost, Dunstable, Bisham, Tintern, Fountains (East end); Easby, Finchal, and in Scotland, Dryburgh, Pluscardine, Elgin, New Abbey, Jedburgh, and Glasgow, and Ireland, Christ Church and St. Patrick's Cathedral's, Dublin; Kildare, Kilkenny, not to mention many others. Observe here, that all the dates I have given are of the first half of the century. In point of fact, the style to which I must direct your attention is seen in some of its earliest efforts, fairly complete in the last twenty years of the 12th Century, and by the end of the reign of Henry III. had

become so changed as to be in truth a different style. It is only in a rough and arbitrary way that one can talk of the art of a century, and it must be always as of that which most distinguished the century, rather than of that which was practised throughout the whole course of it. There was too much life and change to make any other treatment of the question possible. Of the examples which you can most easily study on the spot are, of course, Westminster, the Temple Church, St. Mary Overie, the Archbishop's Palace Chapel, Lambeth; and in the neighbourhood of London, St. Alban's Abbey, Stone Church, Rochester Cathedral Choir, and Dunstable Priory.

If I do not at every turn refer you to examples, it is because I know you will visit them and examine them for yourselves; for this is part of the excellent programme of our Society.

A few words as to how you should do this. Observe, wherever you go, the following points in every building:—1. Ground plan and plan of groining. 2. General character of design. 3. Character of piers and arches, and mouldings. 4. Character of traceries and areades. 5. Special features of construction. 6. Furniture, monuments, and details generally. And, to enable you to do so, let me tell you in a few words what you will usually find and should look for in such examinations.

1. Ground plan.

Most Romanesque and foreign plans had apsidal terminations. Canterbury had one, but copied from Sens; Westminster apsidal designed in England, but under somewhat French influence.

English prejudice was, however, against the apse, and it is very rarely introduced in work in this country. Glastonbury, "a well of English undefiled," is square ended, and the influence of this abbey was very great. All the churches in the Irish Pale are square-ended. A great number of 12th Century apsidal east ends were destroyed in the 13th and 14th century in order to make room for square ends,—sometimes under difficulties, as e.g., at Winchester and Gloucester, where the crypts remain apsidal although the square structure is altered. Stone Church, which was obviously built by the same men as Westminster, is square ended. In fact apsidal terminations after end of 12th century were very rarely constructed in England, though many were pulled down.

The ground-plans of churches within your reach for study afford all that you can desire in the way of illustration. In Westminster Abbey you have a very English version of a French chevet, as the apsidal end with its aisle and chapels is called. You need not be told how beautiful its general effect is. But if you will examine its ground plan you will see how extremely scientific it is in every arrangement, and how it grew out of the necessities of the case. Agreed that your central roof must be lofty, properly lighted, and covered with a stone vault, and the apsidal form makes it necessary to provide buttresses radiating from the centre. In order to provide aisles round the apse these buttresses have to be carried on arches, and thus become flying buttresses, and the spaces between them become available for use as chapels, opening out of the aisle or procession-path.

(To be continued.)

THE HISTORY AND AESTHETICS OF ARCHITECTURE.—IV.

MR. STATHAM brought his course of popular lectures on Architecture, at the Royal Institution, to a close on Saturday afternoon, with a description of the development and leading features of the Gothic style. The address was illustrated by photo-lithographs distributed amongst the audience, and by numerous coloured large-scale drawings of typical details in each phase of the style, which were hung upon screens.

There was no period, the lecturer said, at which so much activity in building prevailed in the north of Europe as at the beginning of the 12th century. One very curious reason for this sudden commencement of large and important buildings was that the world had safely passed through the year 1000, in which it had been generally expected to come to an end; but another and less vague impetus to build was the frequent adoption of a conventual life, especially in France during the reign of Louis VI. The needs of monastic establishments effected a transformation in modes of building, and their remains

now formed the chief monuments of the style. The buildings of the Cistercian order were amongst the noblest examples of pure and simple work of Early Gothic architecture. They had monasteries at Furness, Fountains, Kirkstall, Valle Crucis, and many other places, where they secluded themselves from the world. Their buildings depended almost entirely for their beauty upon fitness and appropriateness, and hardly at all upon mere ornament. The general plan of a Cistercian monastery was exhibited and explained. On the south side of nave of the long, cruciform church abutted the cloister, which, so far from being but an ornamental adjunct, was designed as a mode of communication between the church and the various rooms, the refectory on the south, the frater and the chapter-house and day-room on the east. Along the west side was a long room, which had been proved by the investigations of the late Mr. Edmund Sharpe to have been the domus conversorum, or place where the lay brethren who lived without the convent assembled. This room was usually divided by a double range of columns down the centre, and consequently vaulted in two spans. The same general plan was generally followed in monastic establishments. On comparing the vaulting plans of a Roman, Romanesque, and Gothic building, a great difference would be seen. In the first, half-columns were placed against the outer walls, and other columns abutting on the inner sides of the walls, the lines of vaulting passing diagonally across. The external columns became square pilasters in the Romanesque and style, and the internal columns were brought away from the walls. In the Gothic building the piers kept much the same position as in the Romanesque, but the walls were broken up into sections, and these were turned edgewise, the better to resist the thrust. In this alteration in plan, caused by the pointed arch, was the distinctive difference between Roman and Gothic architecture. A key diagram of the features of Gothic architecture was explained, the lecturer enforcing the fact that repetition was an essential quality of Gothic architecture of every period; each arch and its surroundings formed a section of a design, each part of which could be studied separately. The mode in which the blank space on the internal wall, caused by the abutment of the aisle roof, was occupied by the triforium arched was instanced as an example of logical and effective ornamentation, and another was the addition of flying and solid buttresses to resist the outward thrust of the vaulted roof, and convey it to the ground. In French cathedrals, in which the walls were carried to greater heights than in this country, the buttresses became very towers, and seemed as it were like a series of giant hands clasping the building, and with their outstretched fingers forcing the walls inwards. Although the internal vaulting was of stone, the outer roofing was of timber, because it was found difficult to make the joints of masonry watertight; had the Gothic builders known the use of Portland cement, the mode of roof construction might have been different. Having described in detail the chief features of a Gothic church, the lecturer went on to explain the process of development of the style. The difference between the Norman and Transitional styles was exemplified by means of bays of each placed side by side, the enlarged window space, the introduction and uncertain use of the pointed arch, and the peculiar nicking of the abacus of the capital being indicated as characteristics of Late Norman work. A series of four capitals sketched inside the western portal of Peterborough Cathedral were illustrated, the lecturer remarking that whether carved by one artist or by four, they furnished perfectly clear examples of the progress of Gothic foliage. In this Transitional period the carving of leaves was still straight, stiff, and sturdy; the piers were square and very thick, and attached to them were small, circular shafts, for the arches were being broken up into several members. The next period of Gothic was known as the Lancet style from the form of its window openings. In it the pointed arch was universally adopted, but the round form was retained for the triforium to inclose coupled pointed arches, above which was a quatrefoil, affording the first suggestion of tracery. The style depended upon construction, and not on ornament for effect; indeed, almost all the finest architecture in the world was independent of mere decoration for beauty. When a building was plastered over with ornament, it was an, almost certain sign

that the true object of architecture was forgotten and that the builder was attempting to cover his want of constructional knowledge. The whole interest of a 13th Century building consisted in the frank and perfectly commonsense way in which its purpose was expressed; the clerestory windows to admit light to the central space, the flying and aisle buttresses to support the roof and give massiveness to wall, and the very base courses of plinths forming the groundwork of the whole design, as well as performing a constructional office. The carving of foliage flowed in curves, but was still marked by its stiffness. An effect of decoration of the arcades was often entirely produced by the contour of the mouldings and the consequent alteration of light and shade, without the introduction of a single sculptured leaf or flower. The piers had now changed in form from a square to a lozenge on plan, and several shafts were now attached to them, and that not alone at the inner angles. This pure style was succeeded by two forms of Decorated architecture, the Geometrical and the Curvilinear. More ornament was employed; the windows were filled with tracery, the lines of which flowed one into the other; crockets were added to buttresses and canopies, and capitals were surrounded with a band of foliage, which no longer appeared something growing out of the head of the column, but an applied ornament. The foliage was less conventional and more varied in character. In like manner bench ends and similar features were covered with carving, and a small ornament known from its form as the ball-flower was used everywhere—sometimes with good effect, but often too profusely, and in some districts carved upon every portion of the window mullions and other surfaces. The lines of mouldings were chiefly in half-rolls. As the tracery was developed, the window space was increased; it was absurd to regard Gothic as a style which sought to exclude the light, for in no mode of architecture were the window openings so large in proportion to the masonry as in the later forms of Gothic. A further development of the style was distinguished as the Rectilinear period. There was now a great predominance of horizontal and vertical lines in place of the springing forms and flowing curves that had preceded this phase of the style; the arches were now struck from four centres and were flattened at the crowns; right angled lines defined every window and its parts, and panelled surfaces were general. The triforium was reduced to a mere passage behind the piers. Throughout the building there was seen a tendency to hard straight lines, rather thin mouldings, shallow carvings. Where foliage was used it was dotted on to the capitals in a conventional and simple manner, and often it was omitted. The whole seemed designed for saving trouble to the designer and workmen in all but the vault. While, however, this tendency to reduce everything to right angles was developing in this country, singularly enough, French Gothic was becoming more and more flowing with its lines, till it became flame-shaped in character; hence its distinctive name, Flamboyant. In France alone the outline of the basilica was more strictly followed at the east-end, which was usually rounded off into an apsidal form, and surrounded by chapels, while the typical English east-end was at every period square. To this broad rule there were exceptions, and at Westminster Abbey might be seen a building built very much under French influence, and after their mode. But he must return from these details to describe the development of the arch and vault. Last week he had shown how the flat soffit of the Roman arch became broken up when smaller materials were used, and the influence the change had on the form of the columns from which the arch sprang. The rich effect this multiplication of recessed members gave in Transitional Architecture might be seen from a drawing of the west front of Tewkesbury Abbey. Another step was to have a square abacus beneath which the capitals and round shafts were continued, and it became necessary to break the abacus into projections to assimilate with the parts above and beneath. A further development was to round off the abacus to follow the general outline of arch soffit and grouped shafts, and afterwards the jointing was arranged to fall into the centres of the hollows,—a characteristic of the best work—and at length every sharp angle was cut off, and all the mouldings were worked in the chamfer plane. The pier was gradually getting elongated, and was being turned with

its narrow edge towards the church. But what effect had these changes had upon the vault? The first step was to mark the main lines of the crossing vaults by projecting stones. The next was to add more ribs, intermediate ones being stretched across the centre of the vaulting space. A result of this was that it was found that the arch would stand on the ribs alone; thus, instead of two arches, the vault became a collection of arched ribs. The surface masonry was no longer used for support, and so its joints were arranged for effect instead of to afford the greatest strength; they were laid in horizontal courses, and not placed at right angles with each other. Greater elaboration followed, and cross or lierne ribs were worked upon the surface so as to cover it. The ribs did not spring at equal distances from each other, and, to overcome the awkward appearance, the boss from which they were projected was enlarged, and a step made towards the fan-vault. At length the boss became an inverted cone, and the ribs were caused to radiate at equi-distances around it, and at the same angles. The vault thus became symmetrical, completely consistent, and logical in expression as well as purpose. But the real construction of the vault had again become completely changed, and had reverted to its earliest principle, for, as in its first conception, the vaulting surface was again supreme and the ribs were but applied ornaments. Though the result when placed side by side with the original form was so different, yet the progress of its development was perfectly natural. He had now traced Gothic to its fullest development. More and more ornament was added, and it became constructionally weaker and weaker, and at length was abandoned in favour of a revival of older styles. It would be seen that the course of lectures now brought to a close had taken them from Greek to Gothic. As far as European architecture was concerned, there were but two styles, Greek and Gothic, consistently constructed on one principle. They had examined into the principles governing Greek, Roman, Romanesque, and Gothic architecture, and had traced the steps of their progress, and they had seen that the latest development of the last-named style, although totally different in form, was lineally descended from the Greek. There was a lesson to be learned from this study of the expression of architectural principles applicable to the present day. At the time of the study of ancient literature there was a revival of architecture, and for the first time, instead of developing existing ideas in building, people began to suppose that the best mode to improve architecture was to imitate what had been done before. No longer was a man frankly to build as his needs and tastes suggested, but he was expected to follow what some one had done, as was supposed admirably, many years before. In Renaissance work the lecturer would admit he could see much that was exceedingly interesting and suggestive, but the old principle of work was departed from. This imitation of the past had since taken many forms; during the present century they had seen a revival of Greek, of Roman, of Gothic, and lastly of the style known as Queen Anne, a new combination made in the Renaissance period, when the Greek forms as corrupted by the Romans, then as modified by the Italians, were next altered by the Dutch and then, by the force of political circumstances, brought into England. In conclusion, Mr. Statham expressed the hope that the lectures had shown that architecture was worthy the attention and study of educated people, and what was logical and what inconsistent building. He had not tried to show a series of pretty pictures of buildings, but to exhibit their constructional anatomy and typical arrangement, and, in the words of a French author, if he had been dull they might be sure he had desired it.

THE IMPROVEMENT OF DUBLIN HARBOUR.

At a meeting of the Institution of Civil Engineers, on the 20th May, Mr. Bateman, F.R.S., President in the Chair, the paper read was on "The Improvement of the Bar of Dublin Harbour by Artificial Scour," by Mr. John P. Griffith, Assoc. Inst. C.E.

The primary object of all early engineering efforts connected with the Port of Dublin appeared to have been to provide a safe approach for vessels to the city. With this in view the Great

South Wall was constructed during the 18th century. The rivers Liffey and Dodder, discharging into the sea at the head of Dublin Bay, flowed over extensive strands laid bare at low water, and the channel cut by the rivers was used by vessels entering the port. The Great South Wall was built to shelter this channel from southerly winds, and also from the encroachment of sand. When completed, it accomplished to a great extent the objects looked for by its designers. Portions of the channel up to the city were still, however, very shallow, and attention was also drawn to a shoal beyond the extremity of the new wall, known as Dublin Bar. This bank stretched from the north side of the bay across the entrance to the harbour in the form of a hook. The deepest water for vessels was round the end of this hook, but across the bank, in a direct line to sea, there was only a depth of from 5ft. to 6ft. at low water of spring tides. At the beginning of the present century many eminent engineers and naval officers were consulted respecting further improvements. Captain Bligh recommended a wall along the north side of the channel; Sir Thomas Hyde Page proposed a similar wall, and the formation of an island on the bar; while a proposal to construct an embankment or wall extending from the north shore towards Poolbeg emanated from the Corporation for Preserving and Improving the Port of Dublin, better known as the Ballast Board. Mr. Rennie, at that time considered the highest authority on the improvement of harbours, prepared an elaborate scheme, but he predicted little likelihood of much improvement on the bar. He expected an increased depth of 3ft. of water as the result of an estimated expenditure exceeding £655,000. To provide a better approach he considered it essential to construct a ship canal from some point on the adjacent coast, where deep water might be obtained, and finally recommended this entrance to be close to the present site of Kingstown Harbour. Mr. Rennie's estimate for this work was £489,731. From 1802 to 1819 the question of the improvement of the bar appeared to have been in abeyance. Probably Mr. Rennie's scheme, from the large expenditure it would have involved, and the smallness of the results anticipated, tended to deter the Government from advancing the necessary funds for any particular scheme. About 1819 the Ballast Board found themselves in a position to carry out their own project of a wall or embankment from the Clontarf shore. Its object was to protect the harbour on the north side from the encroachment of sand, to shelter it from northerly and easterly winds, and to direct the tidal and river waters in a fixed channel across the bar. Before, however, beginning this work, an accurate survey of the river and bar was made by Mr. Francis Giles. Under the joint direction of Mr. Giles and of Mr. Halpin, the engineer of the Ballast Board, the rubble embankment, now known as the Great North Wall, was constructed, extending about 9,000ft. from the Clontarf shore, its extreme end being about 1,000ft. north of Poolbeg Lighthouse. Over 5,500ft. of this wall rose above high water, the remainder being below that level, and the extreme 2,000ft. only reaching on the average half-tide.

During the first half of the ebb, the tidal and river waters running out of the harbour flowed partly over the submerged wall and partly through the harbour entrance, between its termination and Poolbeg Lighthouse. As soon, however, as the tide fell below the level of the wall, the water contained within the two great piers of the Port passed through the contracted entrance at Poolbeg. The velocity of the stream was thus greatly increased, and a channel had been formed across the bar with 16ft. at low water of spring tides, where, in the year 1819, there was only a depth of 6½ft., and there was reason to believe that a still further increase might be looked for. As the improvement of the bar appeared to be due to the water discharged from the harbour during the second half of the ebb, any addition to the tidal capacity of the harbour below that level might be expected to produce a corresponding increase in the depth on the bar. Such an increase in the tidal capacity of the harbour was actually taking place by the lowering of the North Strand, the result of dredging ballast and the wasting away of the bank.

The consideration of the difficulties overcome in the improvement of the approach to the Port of Dublin naturally led to the inquiry, what

were the dangers which beset the maintenance of the deep water channel across the bar? These might be briefly summarised as reclamation within and outside the harbour. Reclamation inside the harbour would be dangerous as an encroachment on the scouring capacity of the harbour. Reclamation outside would result in the reduction of the area upon which sand entering the bay was at present deposited, would tend to drive the low-water mark rapidly further out to sea, and greatly endanger the channel across the bar.

PAINTINGS ON CHINA.

AT the Art-Pottery Galleries of Messrs. Howell and James, 5, Regent-street, Pall Mall, a very choice exhibition of paintings on china are now on view, which we have had an opportunity of inspecting. The works are chiefly by lady amateurs and artists, and display a variety of design and handiwork of considerable merit. One of the special awards for ladies—the gold and silver medal presented by the Crown Princess of Germany, and the Princess Alice prizes—consisting of silver and enamelled badges, has been awarded to Viscountess Hood for a plaque with a figure painted upon the old Willow pattern. The workmanship is of excellent character if we cannot commend the design. Miss Edith Hall's designs, which have received the Princess Alice prize, are marked by considerable taste. One of the plates, numbered 12, shows a conventional treatment of the daffodil, the flowers of which are ranged radially from a dark green centre, it has a scalloped border, the ground being white. No. 25 shows a blue-green margin with wild roses and figures very delicate in the handling. No. 18 is another plate with lily pattern on a blue ground exceedingly pleasing in the arrangement, the flowers being disposed of hexagonally in the centre of plate. Miss Ada Beard's panels in china, for which the prize of H.R.H. Princess Christian of Schleswig-Holstein has been awarded, are painted with much delicacy upon cream or grey grounds, and represent lilies treated naturally. Nos. 2 and 4 are remarkably fine patterns, Persian in character, with leaves and birds, conventionalised, dark blue upon white, designed by Sir H. Rawlinson, a well-known authority in this branch of art. These plates have received the Countess of Warwick's prize. In one of the plates long indented leaves are introduced round within the border, the directions of which are curvilinearly arranged, not radially, from the centre. Nos. 14 and 20 are exquisitely painted plates, by Miss Everett Green. On one the ground is salmon-toned, upon which tomatoes are painted, the birds being drawn in the Japanese fashion. "Is he Dead?" is the title of the second, showing parrots upon a branch looking upon a fallen comrade. The designs for heads are interesting. Mr. Percy Anderson's "Classical Head" (No. 1), painted as a plaque framed, is masterly in composition and outline upon a buff ground. The painting is flat and thoroughly in keeping with the material. As the work of a gentleman amateur, the prize was not awarded. Lady Nicholson's plaque (No. 5) shows some very charming handling of a girl's face. In the ornaments, birds and flowers, No. 26, "Under the Mistletoe," by Mme. Camille Moreau, is a striking example in relief; No. 17, "Chrysanthemums," and Miss E. Lock's "Cardoon Thistle," are also tasteful productions. In an upper gallery, are to be seen many striking examples of china painting by professional artists. We notice particularly a panel, framed in an ebony frame, as quite a finished picture of fruit and flowers. The blue jars, colouring and drawing, are all excellent; the one objection we have to make being that it imitates too closely a painting on canvas in its depth of tone and finish. Miss Ada Hubbard's series of plates, in a frame, upon which flowers are painted after a Japanese manner, are well worth the £10 10s. prize that has been awarded it. Silver medals have also been won by Miss Linnee Watt (233) and to Miss Florence Lewis (265); the latter is a study of chrysanthemums in a pleasing harmony of colour. In the heads we notice Nos. 287 and 289, two very cleverly-conceived studies, classical in spirit, by Miss Phené Spiers, one entitled "Diana Vernon" and the other "Helene." Both are excellent in drawing and colour, the borders are quiet and graceful, and the designs are worthy the taste of this lady artist. We cannot pass Nos. 292 and 295, by Kate Hammond, both exceedingly clever in conception and

colour; nor a terra-cotta bust of Sir P. Cunliffe Owen, K.C.M.G., in which the features have been modelled with considerable truthfulness. Those interested in china painting may spend a pleasant hour in the extensive galleries of Messrs. Howell and James.

BOOKS RECEIVED.

The Student's Text Book of Electricity, by H. M. NOAD, revised by W. H. Preece (London: Lockwood & Co.) will be found a really useful and trustworthy guide by all desirous of studying a science which at the present time bids far more than any other to modify and change the conditions of our lives and habits.—*Electric Lighting and its Practical Application*, by J. N. SNOOBRED (London: Hardwicke & Bogue) is especially of value to those anxious to know something about the practical application of the electrical light, as the work of one who, as his evidence given before the Parliamentary Committee has shown, has done more than anyone else to bring down to the comprehension of ordinary people the cost and merits respectively of the electric light and other methods of artificial illumination.—*The Secret of a Clear Head* by J. MORTIMER GRANVILLE (London: Hardwicke & Bogue), is a pleasantly written treatise, in which the moral and physical conditions necessary to the preservation of health and intellect are expounded.—*The Controversy on English and American Locks*, by HENRY W. CHUBB (London: Chubb and Son), is a reprint of the principal letters and articles which appeared in our own and other journals a month or two back. The controversy originated in a letter sent to the *Times* by Colonel Wrottesley, inclosing one from Mr. James Hill, of Upper Thames-street. The facts put forward by Mr. Hill in that letter soon brought down upon him attacks from all quarters. The letter written by Messrs. Chubb and Son, which appeared in this journal on January 17, was hardly necessary to convince anybody at all conversant with the matter that their position and reputation as one of the leading lockmaking firms of England was in no way compromised by anything Mr. Hill had published; indeed, that gentleman especially mentioned them as one of the exceptional lock firms of this country. Still it did good, if only by enlarging the field of controversy, and the very fair selection now made and published from the subsequent correspondence will do more, by placing before the public the best utterances on each side of a discussion which was undoubtedly one of importance, and which Mr. Hill has probably had no reason to regret that he originated.—*The Softening and Purification of Water* (London: F. H. Atkins & Co.) is a pamphlet full of useful information and hints of that most important subject the supply of pure water. The experience gained by its authors is placed before their readers in a practical and intelligible manner, and will doubtless aid many house-owners and builders in their efforts to obtain that primary necessity to health and comfort, pure and soft water.—*Illustrated Catalogue of Cow-house and Piggery Fittings* (London: St. Pancras Iron Work Co.), is an exceedingly useful little pamphlet. Altogether apart from the special merits of the appliances described, which are manufactured by the St. Pancras Co., and about which there is no need to say anything here, some valuable hints as to the planning and arrangement of dairy buildings may be gathered.

The Local Board of Cirencester last week accepted the tenders of Mr. F. Crockam, of Starcross, Devon, amounting together, as reduced, to £8,047 10s. 10d., for the execution of sewerage works in two contracts, according to the plans prepared by Mrs. R. B. Grantham and Sons, civil engineers, of London. At the same meeting Mr. William Bundy, of Old Kent-road, London, was appointed clerk of the works at a salary of £1 per week.

The Prince of Wales, accompanied by the members of the Metropolitan Board of Works, will open Lambeth Suspension, Vauxhall, Chelsea Suspension, Albert and Battersea bridges free from toll tomorrow (Saturday).

The extensive furnishing premises of Messrs. Atkinson and Co., in the Westminster Bridge-road, comprising eight houses, have been remodelled and refurnished. The works, now almost completed, have been carried out by Mr. Nightingale, from the designs of Messrs. Giles and Gough.

Building Intelligence.

ALLERTON.—The new church of St. Peter, Allerton, near Bradford, was opened on Sunday. It has been erected from the plans of Mr. E. P. Peterson, F.S.A. It is of the style prevailing about the middle of the 13th Century, and is simple in treatment. The edifice is not of large size, and is without side aisles. The tower at the west end of the building is flanked on one side by the entrance porch, and on the other by the vestry. This tower is 71ft. to the embattled parapet and about 100ft. to the vane, and is 16ft. square. The church is lighted by a series of lancet windows 12ft. by 2ft. placed high above the floor level. At the south-east end of the building projects an organ chamber 12ft. square. Some relief is also given on the north side by the conical terminal to the circular stair, and also by the buttressed and embattled chimney stack which serves for the heating apparatus. In the basement at the east end an excellent parish room 25ft. square and 14ft. in height is obtained. The building is erected of local wallstone known as "insides," many of them strongly coloured with iron marks, and the dressings are of local sandstone. The whole is covered by Westmoreland green slate, with Staffordshire red tile ridges, overhanging eaves, and stone tabling. The body of the church is 84ft. by 25ft., and is 54ft. to the ridge of the roof, which is boarded, stained, and varnished. The interior is divided into seven bays, two of which form the chancel, and five the nave. The whole of the interior is lined with clean-cut wallstone, and the windows are glazed with cathedral glass, blotched with squares of stronger tints. The pulpit, choir seats, and low chancel screen, are of pitch-pine, the nave seats being temporary benches. The altar stands upon an oak pace, worked in chevron pattern, and is raised five steps above the nave. The font is of Caen stone, elevated upon a pediment of similar material. The church has accommodation for 300, and the building has cost £2,800, exclusive of site. The following are the contractors:—Masons, Messrs. J. Wilkinson and Son; joiner, F. Gawthorpe; plumbers, Haigh and Slater; slater, T. S. Stoner; painters, Cockroft Bros.; carver, Wm. Ashton; tiled work and font, F. Stako; heating apparatus, E. Thornton.

BEDSTONE.—The church of St. Mary, Bedstone, Salop, has recently undergone restoration at an expenditure of about £1,200. The church is one of the smallest, if not the smallest, in the diocese. It consists of a nave 32ft. 6in. long by 17ft. wide, and a chancel 16ft. 9in. by 13ft. 3in., and a small bellry. It is a plain structure of Norman, if not of pre-Norman date, and was last repaired about the year 1854. The architect, Mr. Kempson, of Hereford, in dealing with the church in the work of restoration, has carried out the stonework in work of Norman character. Four circular-headed lancet windows have been introduced in the south-west side of the nave. A single lancet window has been placed in the south side of the chancel, and another in the west end of the nave. The new bell turret is framed in oak, and placed over the west end of the nave, and measures 10ft. square; its base is covered with lead, and the turret itself is surmounted by a spire which is covered with oak shingles. The roofs of the nave and chancel are quite new, and are framed in a substantial and simple manner, and are covered with Broseley tiles. The floor of the chancel and the passage in the nave are laid with Godwin's tiles. Mr. Henry Welsh, of Hereford, was the contractor.

BRISTOL.—On Saturday last the new grammar school at Bristol was opened. The building has been designed by Messrs. Foster and Wood. The style is that of the 14th century. The dimensions of the ground line are 158 feet by 68 feet, and the height to the terminals of the gables is 90 feet. The east and west fronts are similar in character; one faces Queen's-road, and the other on the Tyndall's Park side, opposite the new road which will probably be some day made from the upper part of the park into Park-row. The building is of red local stone, with freestone dressings. The large schoolroom is 140 feet long, 50 feet broad clear of the walls, and 50 feet high from the floor to the collar-beam of the roof. The seats and desks provide accommodation for between 400 and 500 boys. The exterior lines of frontage are broken up by massive buttresses forming bays of each set of

windows. These buttresses terminate at a line marked with moulded cornice of freestone carried round the entire building, with gargoyles above the terminal of each buttress. The walls all round the structure are battlemented. The pointed roof is covered with green slate, and surmounted with terra-cotta cresting, a striking feature of the exterior wall being the turrets which rise above each transept. The turret on the west side contains the staircase leading to the clock-tower, and a private staircase by which the head master can reach the large room. The clock-tower has a cupola of copper of elaborate design, executed by Messrs. Chew and Sons, of Stroud. There are five bells connected with it, the heaviest weighing 9wt. The clock has been supplied by Messrs. Gillett and Bland, of Croydon. Cloisters at the north and south ends lead, on the north from the science classroom to the laboratory, and on the south to offices and lavatories, these adjuncts forming wings. The master's house stands in a prominent position on the high ground. The total cost of the building, including the site, will be nearly £20,000. The clerk of the works is Mr. George Salmon; the general contractors, Messrs. Wilkins and Sons. Mr. John Wilkins has done the plumbing and gas-fitting, and the gaseliers and pendants were supplied by Hardman, of Birmingham.

INCORPORATED CHURCH BUILDING SOCIETY.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its monthly meeting last week. Grants of money were made in aid of the following objects, viz:—Building new churches at Bromley, St. John, Kent, £100, and Camden Town, St. Michael, London, £450; enlarging or otherwise improving the accommodation in the churches at Castleorton, St. Gregory, near Tewkesbury, £50; Locklow, St. Bartholomew, near Leominster, £40; Harbledown, St. Michael, near Canterbury, £50; Marsh Gibbon, near Bicester, £20; Westleigh, St. Peter, near Bideford, £30; West Tilbury, Essex, £20; and Bettws-Guerfil-Goch, near Corwen, £30. Grants were also made from the Special Mission Buildings Fund towards building mission churches at Malin Bridge, in the parish of Wadley, near Sheffield, £10; Plymouth, Henry-street, All Saints', £25; and Springfield, in the parish of St. Mary's, Wolverhampton, £25.

CHIPS.

The Bristol Docks Committee on Monday recommended the Town Council of that city to purchase Avonmouth Dock at a cost of £600,000.

The Lambeth Guardians have appointed Mr. Scott surveyor of works for the reconstruction of the industrial schools at Norwood, about to be carried out from the designs of Messrs. Coe and Robinson.

From correspondence in the Cambridge newspapers, we learn that the authorities of Jesus College have repurchased in London all the carved woodwork of Bishop Aleock's time, formerly belonging to the college chapel, which was recently offered for sale by the rector and churchwardens of Landbeach.

On Saturday week a labourer named Thomas Whitwell was killed while at work in Pelrocktown Church, Devon, now in course of restoration, by the fall of a beam of oak which was being fixed in the roof.

The Watford Local Board of Health have just commenced the construction of a new reservoir at some little distance from the town. It is estimated to cost, with new main and cottage, £7,483.

It is stated that Mr. de Keyser has accepted a tender of £80,000 for the completion of his hotel at the corner of the Thames Embankment, opposite Blackfriars Bridge.

Amongst those upon whom the University of Cambridge propose to confer, on the 29th inst., the honorary degree of Doctor of Law, are Sir F. Leighton, P.R.A.; Mr. H. C. Sorby, President of the Geological Society; Mr. E. A. Bond, Principal Librarian of the British Museum; and Mr. C. T. Newton, of the British Museum.

The school erected to the memory of the late Rev. H. C. Hicks, at Hucknall Torkard, was opened on Monday. It is built in the Gothic style, of rough stone, with wooden casements and plain open roof. The schoolroom is 56ft. by 21ft., capable of sub-division into three by folding doors. Mr. F. Gratton, of Hucknall Torkard, was the architect; and Messrs. Holesworth and Green were the builders.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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RECEIVED.—T. M.—W. H. B. and Co.—B. B. and T. Co. B. S. and H.—L. W. and Co.—C. H. and Co.—W. M. F.—S. E. Co.

OUR COMMONPLACE COLUMN.

C. F. W., G. H., C. A.—Notes or quotations on any subject of value in letter H will be received on and after the 27th inst. We wish to impress upon our contributors that the articles should be concisely written, and that data respecting buildings and materials are of greater value to us than definitions. We hope to publish another column next week.

Correspondence.

TEMPORARY BUILDINGS.

To the Editor of the BUILDING NEWS.

SIR,—In your recent article (p. 500), is the following:—"The erection of structures of a temporary kind at once light cheap, and portable is a want that has been strangely neglected by the architect, notwithstanding the numerous demands for such a class of structure and our colonising propensities." I feel that I am not one of those to be included in this accusation of strange neglect, and I trust that the following short description will prove this, and give some idea of what I have been doing in this direction and the improvements I have effected. I have arranged, I believe, an entirely novel system of portable buildings, either in wood or iron; temporary, or rendered so complete that they will meet all the requirements of a permanent abode.

In forming the panels or walls of wooden buildings it has been usual to use wood quartering or framing, and to fix upon it weather boarding externally, and matched tongued and beaded boarding internally. The nature of the weather boarding to spring away from the quarters to which it is nailed, by the action of the weather, necessitates the quarters being closer together than is required for constructive purposes, and adds to their weight in carriage and unwieldiness in handling.

By my system, I dispense with all quartering, and form panels, say, 8ft. high, corresponding to the height of an apartment or story, and 4ft. wide for convenience, having weather boards externally laid, horizontally grooved on the edges, and fixed so that the edges interlock the side of one groove entering as a tongue into the hollow of the other. The internal face is of tongued matched and beaded boarding laid vertically. Between the inner and outer boarding there is a sheeting of inodorous felt, and the two thicknesses of boarding are nailed and clenched together, forming a perfectly rigid panel free from all liability to rack, and weather-proof. The inside boarding

is wider than the outside boarding, so as to extend beyond it, forming a projection or tongue on each edge, which fit into corresponding vertical grooves on the standards set up when the building is erected at the required distance apart to receive them, and in these grooves the panels are retained without any further means of attachment. The ends of the weather boards butt up against the solid portion of the standards, thus forming a rebated weather-proof joint, and avoiding the labour of shaping the grooves to the ends of the standards.

The standards and other constructive parts to receive the panels consist of angle posts grooved two sides to receive the external panels; intermediate grooved two sides for joining the panels; junctions, grooved two sides for the panels, and inside to receive partitions; door-posts grooved one side for panels and the other side rebated for the door; casement frames, &c., the like. Also transomate gables; caps, sills, &c., which are grooved to receive the horizontal edges of the panels.

The internal partitions are of the thickness of matched tongued and beaded boarding, one laid vertical, the other perpendicular, with a sheeting of inodorous felt between. All the standards, &c., are fixed to the sills, plinths, &c., with gas-barrel dowells.

The roof is formed of panels having quarters covered externally by preference with galvanised corrugated iron or zinc, and the soffit with matched tongued and beaded boarding; the cap to receive the wall panels being fixed to the soffit. There are no constructive timbers except the ridge. I have built permanent brick houses and bungalows here with roofs of more than 40ft. span, without any framings or other timbers, only the common rafters and the ridge.

In your article, galvanised corrugated iron is thus described:—"Anything more tasteless, comfortless, and forbidding than the corrugated iron church of the usual type is scarcely possible to find." I fully endorse these remarks, and consider that hitherto this material has only been applicable to buildings of a certain class and use, by reason of the difficulty of forming the angles and joinings, and fitting and fixing the doors, windows, and other parts to the openings. And when these have been done, the general effect of the exterior is scarcely to be tolerated.

By the application of the system I have described to wooden erections, and with the following modifications, this material becomes equally applicable for the exterior of buildings, and the manner in which the corrugations are broken up into panels by the stiles which are of wood presents a good appearance, and the corrugations give a pleasing indentation on the panel, more particularly when the material is painted.

The panels for the outside walls are formed of sheets of iron, their length by preference corresponding to the height of the apartment or panel to be formed, and their number being sufficient to form the width of the panel, which is by preference two sheets, that is 4ft. wide. At the vertical edges of the panel, and at the vertical joinings of the plates, small quarters of wood are placed from end to end of the panel. The quarters on the side which is to be against the iron are shaped so as to fit the corrugations, and those at the vertical edges of the panel are flattened so as to enter the grooves on the standards. Cross pieces are attached at suitable distances apart. This framing is overlaid with a sheeting of inodorous felt, and over this matched tongued and beaded boarding is laid horizontally, and nailed to the quarters, the ends being flush with the quarters at the vertical edges of the panel. The lower edge of the bottom board will rest upon the floor. To this framing the iron is secured by screws to the quarters. Thus a portable and completely finished panel is formed ready for fixing to the standards and other parts described to the wooden building.

A weathering or front over door and window openings is formed by strips of zinc or lead fitted at the lower edge of the corrugated iron opening. The upper part is corrugated to fit beneath the corrugations of the panel to a height or lap sufficient to keep out the rain. The lower part of this strip, where it is not beneath the corrugated iron, is not corrugated.

I hope at some future occasion to describe the buildings that have been erected, or are now in course of erection, ranging from a bungalow of 16 rooms to one of only two, also billiard-rooms, &c., and how it is now being worked out so as to supply what appears to be one of the wants of

the present day, viz., portable buildings prepared in panels readily fitted and light for railway or other carriage, easily set up in the required place, economical in price, easily removed or enlarged by the introduction of panels, which are all interchangeable, and if the building is wished to remain that it will answer all the requirements that are looked for in a permanent abode or for other purposes.—I am, Sir, &c.,
Westcliff, Birchington. JOHN TAYLOR.

THE ARCHITECTURAL REJECTED AT THE R.A.

SIR.—A friend of mine, a graduate, writing from one of our universities on the above subject the other day, makes the rather drastic assertion that "the Hanging Committee at Burlington House ought themselves to be hanged," and notwithstanding its having been quoted as an old saying originally said by an exceedingly eminent painter, I am ready to admit that the statement "savours rather of the gutter." It can never do any good to throw dirt, and I have no desire to impute motives to the Hanging Committee of the Royal Academy. As far as paintings go, the R.A. seems to treat rising young men very fairly as a rule, though some of the members perhaps take too much advantage of their position in hanging their own pictures. It is not, however, in the department of painting that I would turn for a moment, but to Gallery No. IX., where the architectural drawings of the year are hung. And while here I would determine, if possible, upon what system of selection the assortment is made. I have often tried to do this before, and no doubt shall do so again, but thus far no other term can I find to describe that system than this, "the inexplicable." Perhaps someone may be able to enlighten me, and I am only one of the numerous class who at present echo the term "inexplicable." My experience extends (with regret be it said) over a rather long series of Royal Academy Exhibitions, and I am one of the few who have had the advantage of examining the collection of rejected architectural drawings standing below in alphabetical order in the vaults at Burlington House, waiting the "regrets of the Council" to be sent out to the authors announcing their fate. Here in these vaults I have seen very many old friends in the way of drawings, several who had been there before, and some whom I have seen since enjoying the full glory of the public gaze on the walls of Gallery No. IX. Indeed, it is by no means a rule that if a drawing be rejected one year that it will not be hung the next. In the present Exhibition there are drawings which have gone through this ordeal, doubtless on the principle that some things improve by keeping. Of course the Royal Academy cannot hang everything, neither can they please everybody, and I know perfectly well what a tedious and unenviable task it must be to wade through the mass of material submitted for exhibition. I am assured by one of the members of the Hanging Committee that the utmost care is taken with every several selection, and that each subject is individually voted upon, and further, it is said that the Council become more and more particular every year. Quite right, everyone must say, never was there more need for such a strict *regime*. But still I cannot rid myself of the thought "Inexplicable," so great is the contrast between theory and practice, and I turn to the few architects' works represented by the accepted pictures now on the two walls, and a bit of Gallery No. IX. for an explanation. There I certainly see some undoubtedly good work, and more unquestionably bad, judge them by as lax a code as you will. This is an old, a very old experience, and so is the allotment of such very little space, out of the entire series of sixteen galleries, for the exhibition of architecture, as can readily be seen by reference to those who have written in the professional journals ever since there were such things, and all the technical papers this year have re-echoed the complaint. But what cares the R.A.? The members are in power, and they will tell you that they have done their best in making the choice now set forth from Nos. 1,068 to 1,163. These numbers not only represent good works and bad, but well-known names and unknown. The works of people one has never heard of before sometimes get well hung, and for this principle I have nothing but praise. That is how it should be; but then these strangers more than often figure on the walls

with the most commonplace and unsuitable subjects. Thus the selection remains inexplicable, seeing that it is not made upon the principle of choosing only the very best drawings of the year, or representative architecture of the year, neither is it made by selecting only the works of well-known men. And so from the accepted I turn to a few names and works of the rejected drawings with a hope of finding an explanation. Remembering that Sir Gilbert Scott once had a large drawing of the Midland Hotel at St. Paneras, coloured by Mr. H. W. Brewer, rejected, one need not be surprised to find the following company of names among those who had works rejected this year, and I will venture so far as to mark with an asterisk those names whose drawings in my opinion should have certainly had a place in preference, at any rate, to some in the show. Perry and Reed; G. Corson; D. Brandon; Adolphus Cane; J. Cole; Fergusson; E. E. White; E. C. Lee*; Aston Webb*; A. Peebles*; J. James; Henman and Harrison; Jones; Batterbury and Huxley; Ernest George and Peto; W. Niven; W. Millican; Talbot Brown; W. Fawcett*; H. Gribble*; J. Brooks, Theo. Allen; J. M. Brydon; T. E. Colcutt*; J. O. Scott*; T. H. Wyatt; R. Plunbe; M. B. Adams*; Leeming Bros.; Lansdowne and Harris; J. P. Seddon*, J. and J. Belcher; J. Medland; O. Hansard; H. Gundry*, E. J. Micklethwaite; E. J. Tarver; St. Weatherly*; H. W. Lonsdale*; Swinden Barber*; P. J. Marvin; J. Hicks; Basil Champneys*; Ralph Nevill; W. F. Lyon; and others. But these are enough simply as representative of the rejected, while among those who nearly escaped such company was Mr. G. G. Scott, who received the refusal card for all the pictures which he sent, but these now represent him at the R.A. His first intimation that they were really hung was simply the fact of his seeing them on the walls on the opening day. For myself, I have had as many drawings hung at Burlington House as most people, but I cannot but feel that some of my best have been among the refused, and so whether I turn to the accepted or the rejected, or to my own experience, I find no other interpretation of the method adopted at Burlington House for the hanging of the architectural subjects than that of a sort of pot-luck frame-fitting system, and surely this is quite unworthy of such an illustrious institution, even though it feels obliged to relegate so finite a space to what its leading architectural member tells us is the "Mother of the Fine Arts—Architecture."—I am, &c.,
BOTH ACCEPTED AND REJECTED.
May 17, 1879.

CREOSOTED TIMBER.

SIR,—I am glad to see, by the correspondence in your paper, that the evidence given by Mr. Robert Walker at an inquest lately has had the effect of bringing out remarks which are likely to do away with some of the absurd and ridiculous notions now in vogue about creosoting. My first experience in the Bethell's Process was as inspector under the late Sir I. K. Brunel, and till now, over thirty years, I have been constantly engaged in the different processes for preserving timber; from this your readers will perceive that I have some qualification to speak on the subject. Timber very seldom needs that the creosote should penetrate to the heart of the wood; those who have seen the exhibits of creosoted timber at the last Paris and other exhibitions will have noticed pieces of sleepers, telegraph poles, and marine timber, which have been in the ground or water from fifteen to twenty-five years, the hearts of which are scarcely a shade darker than the day they were cut. It is obvious that if timber is to be creosoted to the heart the oil used would be far greater than the usual quantity injected and found to have such universally good effects. Of course the ends of the timber will be black right through, as this is where the creosote enters, and this fact totally falsifies Mr. Walker's idea that the inner pores exert any capillary action on the water, the ends of the timber being thoroughly and hermetically sealed against all moisture. It is very important that all cuts in submerged timber should be done *before* creosoting; unless this is done, as the inventor and patentee said many years ago, the process is deprived of much of its usefulness, as the waterproof coating formed by the creosote is penetrated. Inspection also is a point on which too much stress cannot be laid, to see that the timber is in a proper state and sound for the process, and that the specified quantity of oil is injected, and the inspector's

authority should be respected. I could lay my hands now on timber which has been so-called creosoted in spite of the inspector's opinion that it was too wet. It was wanted immediately, and what wonder that it decays or is eaten by marine worms far sooner than *properly* creosoted wood? Proofs of the efficacy of the process are needless to any engineer of experience; I have collected many during past years, and shall be most happy to show them and give every information I can on the subject to those interested. Being absent on the Continent must be my apology for not replying before.—Yours obediently,
WM. JAS. BRAIN.

ASPHALTE AND TIMBER FLOORS.

SIR,—In your impression of April 25, p. 460, you refer to a new method adopted in France of laying oak flooring, namely, that of embedding the battens in a layer of hot asphalt, instead of nailing them in the usual manner upon the joists. The system, may I be allowed to state, far from being a novel one, has been practised with great success for a number of years, and has obtained a wide application in Hungary and Germany.

The section adopted is as here shown, solid lin.



thick, size about 20in. by 4in. or more. Similar material I can supply ready for laying at 9d. per foot super., or £3 15s. per square. The laying may be accomplished by any skilled joiner.

J. T. E.

HEATING APPARATUS.

SIR,—I see in your Notes from Edinburgh last week, you say that the heating apparatus is not always successful. Why can it not be? With arrangements for the warming of air as now prevails in the majority of churches, I grant you that it is so, except you use the cast iron arrangement and burn the air to ribbons, but it is not difficult to pass volumes of pure warm air into churches at all, in the very coldest weather.

I have been struck with the report of The Hertford British Hospital, in Paris. You therein say "The ventilation is well provided for"—but, you do not say how it is accomplished. Then you say that the building is warmed by means of warm water pipes, laid in floors and covered with iron gratings. What arrangement is there to prevent the germinating of zymotic diseases in these little dens most favourable for their development? The more I read the more I am puzzled. This great hospital, the latest production, seems to be the very place for the germinating of the diseases the whole nation has been writing and talking about annihilating. It may be that I am quite wrong, so I write to be corrected—this is my apology.—I am, &c.,
G. S.

A new Baptist chapel was opened last week at Walsall. The style is Italian, the materials used externally being red brick, with dressings of Hollington stone, enriched throughout with moulded and carved caps, arches, and cornices; and the roof is covered with Bangor slates. Internally, the chapel is 62ft. by 44ft., exclusive of the orchestra, and 30ft. high from the floor to the ceiling. It is fitted with galleries on three sides, and provides 680 sittings, exclusive of the orchestra. In the rear is a lecture hall, 30ft. by 16ft. Mr. W. F. Markwick, Walsall, is the architect; the builders are Messrs. Rowley, jun., and Synex. The cost is £3,368.

The eastern portion of Holyrood Palace has just been re-roofed, for the first time since it was built, at a cost of about £1,000. The part of the Palace which has been operated upon is immediately above the Queen's apartments, and it is expected that, in the course of next year, the roof of the south wing, containing the apartments occupied by the Lord High Commissioner and suite, will be similarly dealt with. The work just completed has been carried through under the superintendence of Mr. Robertson, of H.M. Board of Works.

Our description last week of the new Derby Free Library, on p. 552, furnished from a local source, turns out to be inaccurate in one or two particulars, which the architect has kindly corrected. The builders are Messrs. Woods, of Blackburn and Derby; the architect is Mr. R. K. Freeman, of Bolton; the style is Jacobean, and the cost (stated at £15,000) will include additional buildings yet to be erected. The first contract was let for £7,600, being within £100 of the architect's approximate estimate.

Intercommunication.

QUESTIONS.

[5770.]-**Perspective.**—I should be obliged if any reader would recommend a thoroughly good work on perspective, especially containing directions for treating interiors.—L. MASON.

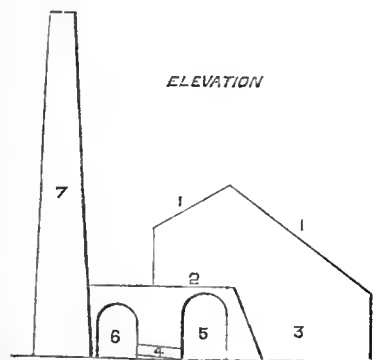
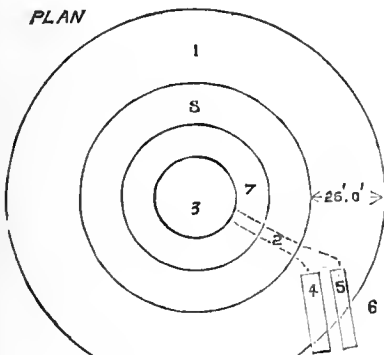
[5771.]-**Government Appointments Abroad.**—Can any reader tell me if there are any appointments as architects or land surveyors (under Government) abroad? If there is any examination to pass to procure same, and where could I write for full particulars?—S. C. G.

[5772.]-**Red and White Wood.**—Would any fellow-reader kindly give me a ready and sure rule to distinguish between red wood and white wood? I have had some timber used lately, which the contractor assures me is of the former class, yet it is the very palest in colour.—KIFFAX.

[5773.]-**Lime.**—Perhaps one of the correspondents of the BUILDING NEWS would kindly explain what "fat" lime is, also the difference between it and "roach" and "quick"? The three terms one often meets with, and they puzzle—AN IGNORANT MAN.

[5774.]-**Thrust of Arches.**—A row of 8 shops, with a frontage of 20ft. each, with brick fronts and two windows on each floor and three floors in height, is built on piers 18ft. by 24ft. and 12ft. high, the arch 18ft. by 18ft., with 1ft. rise and 18ft. span between piers; will some reader kindly explain how the thrust of the arches is calculated, as I think it must be greatest at the ends, and as the ends are corners and required for fronts for shops, how would be the safest way to carry the weight above, as it would not do to put an arch at the end without any abutment except a pier, and to put a breastsummer would be almost as bad, as I think the thrust of the arches would force the corner out of upright? I shall be glad of any information on the above, and an example worked out in plain figures from the description I have given, and allowing the weight of walls and floors as 50 tons weight on each arch, and also on each corner shop. And what would be the formula for safe load for brick piers of the size above, 18 by 24 of stock bricks? An early answer would oblige.—ONE IN A FIX.

[5775.]-**Heating Kiln.**—Please insert following query. We have had it inserted in several papers but have got no answers, so we send it to your journal to which we have been subscribers for many years. Will some of your readers give us the best and cheapest mode of heating a shed 20ft. wide, round a Hoffman kiln, as per inclosed sketch. 1. Large drying shed round the kiln. 2.



Flues from boiler. 3. Stack. 4. Marine boiler. 5. Tube boiler. 6. Two engines for driving machinery. 7. Smoking chambers. 8. Brick burning chambers. Diameter of kiln 8ft. Brick pillar under each principal and closed up, with wooden doors all round. 1. Roof. 2. Top of kiln. 3. Drying shed. 4. Flue. 5. Brick burning chamber. 6. Smoking chamber. 7. Stack.—WOODWARD AND CO.

[5776.]-**Stamping External Plaster.**—Can any reader give me a description of the method of stamping external plaster work and where the dies for same can be obtained.—AJAX.

[5777.]-**Drawing Ink.**—Where can the drawing ink, made by Mr. Featherstone, of Chertsey, referred to

by Mr. Neale in his late paper, be obtained, or how is it made?—T. DREW.

[5778.]-**Latham's Water Supply.**—Would any correspondent kindly say if Mr. Baldwin Latham's long promised work on "Water Supply" has been published, and if so by whom?—W. M. M.

REPLIES.

[5723.]-**Coloured Building Stones.**—I should like to say a few more words in reply to your correspondents, some of whom seem to ignore all colours in stone except that of red. I therefore reply in respect to that colour only. I understand the question as first propounded to refer to a variety of colours, hence my reply. I beg to inform "J. W." and "G. F." that the whole of the red stone in the Hand in Hand Insurance Offices is Corsehill stone, supplied from the Corsehill quarries on the Solway Frith, near Annan, N. B. Corsehill stone is sometimes called Dumfries, but this is a mistake. Corsehill is much denser stone and a better weather stone than the red stone supplied from the quarries round and about the town of Dumfries. Moreover, the beautiful carving in the "Hand in Hand" could not have been done in the soft, friable, red stone. The cantilevers of the red brick mansions near Gloucester-road station (now covered with pigment) are of a red stone, from which the colour has faded. The light coloured red columns in the south facade of the Law Courts are made out of stone which does not retain its original red colour. The dark red stone in the Gloucester-road bridge is Corsehill, supplied from the Annan Quarries. The light-coloured stone in the same bridge is from the Mansfield Quarries. The difference in colour will become more marked as time rolls on. I fully agree with Mr. Saville in his remarks upon the light and dark coloured red stones at the St. Pancras Hotel. Undoubtedly, as he says, light-coloured red Mansfield (although its colour fades) is a better stone than the darker coloured Mansfield. Some of the latter was used for the bases of the lamp-posts in Southwark-street, which are now decaying. Some of the dark red stone in the terraces and coping at St. Pancras station is Corsehill, but this building is not a good example of the use of red stone, as it (the red stone) was supplied from several quarries.—SAMUEL TRICKETT.

[5753.]-**Abutments.**—In reply to "W. J. P." I have carefully examined my paper on abutments and find what "W. J. P." says is correct. I was, when I wrote it, deficient in spare time and disposition to write same, but did not like to let question pass unanswered, and I thank him for his reply.—HENRY ANSOE.

[5745.]-**Wood Roofs.**—ERRATA.—In last week's reply, 60th line, read "increases inversely," &c. 2nd column, 6th line, for "now of length in feet, squared," take out the comma and let it read as follows:—"Now of length in feet squared and multiplied by the integral number of which W was composed." 2nd column, 18th line, for " $2 = \frac{1 \times 1 \times 2}{2} = 1$," read "whence our 2 which has now become 1 by dividing both sides by 2 we have $1 = \frac{1 \times 1 \times 2}{2} = 1$." 27th line, read "because if the constant 20," 29th line, put 25 for 20. 36th line, read "but not necessarily so small in smaller ones."—H. A.

[5750.]-**Timber Verandah.**—"G. H. G.'s" reply is totally without foundation. It is a well-known fact that oak subjected to alternative wet and drip, as in the case of porch or verandah will stand the weather better than any other wood. "G. H. G." would do well to study the nature of the different woods before giving his opinion in such an absurd manner. Oak can, of course be treated in the same manner as all other woods to suit the taste of "W. W. W."—AXIUM.

[5766.]-**Purification of Sewage.**—Write for the "Suggestions as to the Preparation of District Maps and of Plans for Main Sewerage and Drainage and Water Supply," published by George E. Eyre and William Spottiswoode. If you have fall sufficient, I advise you to put your sewage on land and leave alone all other makeshifts such as settling tanks, filtering tanks, &c., &c.—WM. JACKSON.

STAINED GLASS.

GREAT BEDWYN.—A stained-glass window has recently been placed in Great Bedwyn Church, Wilts, by the Marquis of Ailesbury, in memory of his parents. The subject introduced is "The Ascension." The work has been carried out by Messrs. Heaton, Butler, and Bayne, of Garrick-street, London.

WATER SUPPLY AND SANITARY MATTERS.

COCKINGTON, DEVON.—The Torquay water supply has been extended to the parish of Cockington, and the newly constructed reservoir above the latter village was formally filled last week. The reservoir stands at an elevation of 280ft. above the sea, and is supplied from the Torquay water main, which brings the water from Tottiford-on-Dartmoor, about 15 miles distant. The capacity of the reservoir is 50,000 gallons. The work, which was done by Mr. Shaddock, of Saltash, has been carried out in blue lias masonry, lined with Portland cement. The additional water-pipes have been laid by Messrs. Sanders and Sons, contractors, of Torquay. The plans and specifications were prepared by Mr. Weeks, the Torquay Waterworks superintendent.

A new workhouse chapel is about to be built for the Epsom guardians. Messrs. Furniss are the builders.

LEGAL INTELLIGENCE.

THE FITZALAN CHAPEL IN ARUNDEL CHURCH.—Duke of Norfolk v. Arbutnot.—Judgment in this case was given in the Common Pleas Division on Saturday last. The action, it will be remembered, was tried during the last sittings, by consent of the parties, before Lord Chief Justice Coleridge, sitting without a jury. The action in form was one of trespass against the Rev. George Arbutnot, vicar of Arundel, for breaking down a wall which had been built by the duke to divide a part of the church, known as the Fitzalan Chapel, from the rest of the church. The duke claimed the absolute property in this chapel, which was built on his land, and prayed for an injunction to restrain the defendant from further trespass. The vicar, on the other hand, by his statement of defence, set up a claim to the chapel as being a part of the chancel of the church, and prayed for an injunction against the duke to restrain him from obstructing the right of the parish to light and air by building the wall in question. The case occupied four days, and raised many questions of interest to other than legal minds. The Fitzalan Chapel had for centuries been the burial-place of the Howard family, and evidence was given at the trial of an exclusive use of it by the duke's ancestors, stretching over 400 years. The chapel was separated from the body of the church by an iron grille, coeval with the church itself, the key of which was proved to have been always in the custody of the duke or his servants, and it was shown that visitors had never been permitted to visit the chapel except by permission of the dukes. Great stress, too, was laid, on behalf of the duke, in the circumstance that, though the chapel had been suffered to get into a grievous state of squalor and decay, no complaint or assertion of any right had been made by the vicars downward from the Reformation until the bringing of the present action; and moreover, that in the visitations of the Bishops of Chichester from 1762 to 1875 not a single bishop or archdeacon had made any claim to the chapel, and the churchwardens had invariably returned in their reports that the chancel was in good repair at a time when the Fitzalan Chapel was notoriously in the worst state possible of disrepair. The case for the defendant, on the other hand, rested chiefly on the architectural aspect of the chapel, from which it was sought to draw the inference that the building being proved to be an integral part of the church was either a part of the great chancel, or else a lesser chancel; and to strengthen this view of the case, Mr. Butterfield, the eminent architect, was called as a witness by the defendant. Mr. Butterfield had examined the church and chapel, and gave it as his opinion, from the appearance of the whole building, considered architecturally, and the position of the ancient pulpit and high altar in the interior, that there was nothing to suggest to his mind that the Fitzalan Chapel was anything else but part of the chancel of the church. A number of ancient documents, many of them in mediæval Latin, connected with the history of Arundel, formed the rest of the evidence in the case, and were relied on, with equal confidence on either side, to establish the particular views contended for. His Lordship said the principles on which his decision rested were simple and familiar, and if he had taken time to consider his judgment it was more out of regard to the interest attaching to the case than from its difficulty. He was prepared, before the trial commenced, to find that many questions of fact would be disputed, and with that impression he had paid a visit to Arundel Church and inspected the locality, the better to appreciate such points when they arose; but, in point of fact, the evidence produced had been all one way and in favour of the plaintiff's contention. The acts of ownership on the parts of the Dukes of Norfolk had been proved to be many and various. Numerous instances had been given of interment in the chapel without any faculty having been obtained for that purpose and without registry. Instances also had been furnished of the disinterment of bodies at the free will of the duke's ancestors. The chapel itself dated from the 14th century, and the grille or gateway which separated it from the rest of the edifice was fastened by a lock on the chapel side, the key of which had been always kept by the dukes or their stewards. Strangers had been excluded since the Reformation, and the way in which this beautiful building had been treated by the Dukes of Norfolk was in itself the strongest evidence of ownership. One hundred years ago there was a beautiful arched, carved roof, which had now disappeared, and the chapel contained ancient monuments of the Howard family, which had been suffered to fall into a state of dirt, neglect, and mutilation, which many families far less illustrious than the Howards would never have tolerated, and admission, which for three centuries was persistently denied to vicars and parishioners, had been freely granted to owls and bats. It was contended that no remonstrance had ever been made against this state of things, because the Dukes of Norfolk were powerful noblemen, and acquiescence was the best discretion under the cir-

circumstances: but it was to be remembered as against this, true as it was in one sense, that this long line of noblemen, who were Dukes of Norfolk and Earls of Arundel, had for centuries belonged to a religious belief which had been persecuted from the time of Elizabeth to the reign of George III. in a way that was disgraceful to a civilised country. It was impossible to think that if a belief in any right to the building had existed in those times it would not have been asserted either by the vicar of the parish or the bishop of the diocese. He had come to the conclusion, therefore, that the right of ownership in the Dukes of Norfolk to this building had been proved by the strongest possible evidence, and that the ancient documents which had been referred to in the argument in connection with the history of the church as tending to prove one collegiate church did not show so much that the College of Arundel had the building now claimed for their chapel as that they had certain rights in connection with the old parish church at the same time that the parishioners had other rights. With respect to the evidence which had been called for the defence, his Lordship said there was nothing to prove that services had ever been held in Fitzalan Chapel, or that the different Bishops of Chichester had ever exerted any authority over it. There were, indeed, Protestant burials from time to time of members of the Arundel family, but it may well have been that those who were so buried there were interred in accordance with their own expressed wish before their decease, or with the consent of their Roman Catholic successors after death. Then there were the returns by the churchwardens at the visitations of the bishops. What did they show? In answer to the questions as to the state of the chancel of the church the answers were "good," or "very good," or "excellent," and this at a time when the chapel was in a state of notorious squalor and decay. The answers with regard to the tables of the Ten Commandments were to the same effect, by reporting that they were at the east end of the chancel, when there were no such tables in the chapel. Mr. Butterfield's evidence as to the architectural features of the building was entitled to the greatest respect; but what Mr. Butterfield saw was obvious to an ordinary observer, and his evidence was but an intelligent exposition, on architectural grounds, of what was a patent fact. Granting, therefore, that the Fitzalan Chapel was an integral part of the whole fabric of the church, what did it show? The cases of "Chapman v. Jones" (L. R. 4, Ex. 273) and "Churton v. Frewen" (L. R. 2, Eq. 634) were authorities that an integral part of a sacred edifice could be vested in a private person, and a number of instances were to be found in Mr. Freeman's paper, which had been referred to, on ancient churches, where different parts of the building were vested in different owners. With respect to the defendant's claim for light and air, the defendant himself had built up a wooden partition where the present wall now stood, and had placed there a Communion table besides. The litigation had been conducted with courtesy on both sides, and it seemed to him that concessions might fairly be made with respect to light and air which would meet the views of both parties. He, however, had only to deal with the case as it came before him in law and in fact, and upon them he gave judgment for the plaintiff for 40s. and costs, and granted the injunction prayed for. He also gave judgment against the defendant in his counter-claim.

CHIPS.

A double-page perspective view of Mr. Alfred Waterhouse's new building in Holborn for the Prudential Assurance Company, photo-lithographed from a drawing by Mr. J. G. Buckle, will appear in the *Commercial World*, of June 2.

Plans prepared by Mr. J. Wm. Cockrill, architect, Gorleston, have been approved by the Education Department for additions to the Stradbroke-road Schools, Gorleston, for the Great Yarmouth School Board.

The Great Yarmouth Town Council, acting as the Burial Board for Gorleston and Southtown, have purchased subject to approval of Local Government Board, 9½ acres of land to be laid out as cemetery. The plans are being prepared for necessary buildings, &c., by Mr. J. Wm. Cockrill, architect, Gorleston.

A faculty has been granted for the repairing and restoration of Petworth Church, Sussex.

The tender of Messrs. Jeffrey and Son has been accepted for the required additions and alterations to the premises taken in New-street, Birmingham, for the Liberal Club. The architects are Messrs. Harris, Martin, and Harris.

A temporary church was opened at Moseley at the corner of Oxford and School roads on Thursday evening. It is of wood, plastered inside, with slate roof, and seats twenty-five persons. The builder was Mr. Collett, of Balsall Heath.

Our Office Table.

THE annual meeting of the Sunday Society, which advocates the opening of museums, art galleries, libraries, and gardens on Sundays, was held on Saturday afternoon, at the Freemasons' Tavern. Sir H. Thompson presided, and among those present were the Earl of Dunraven, Lord Dorchester, Viscount Powerscourt, Mr. J. C. Dundas, M.P., Sir Arthur Hobhouse, Admiral Maxse, the Rev. S. Hansard, and the Rev. H. R. Haweis. Resolutions were passed expressing satisfaction at the progress made, and at the result of the late division in the House of Lords, requesting members of mechanics' institutes, workmen's clubs, and trade societies to appoint delegates to represent them on the national council of the Sunday Society, and calling upon electors to give due prominence to the question at the coming general election.

The modest dwelling, No. 17, Eldon Place, built by the late Mr. Barnup, of the Barras Bridge, Newcastle-upon-Tyne, about the year 1815, and still in the possession of his family, has, by association, become a place of historical interest as the joint residence of two of its most illustrious townsmen, viz., George and Robert Stephenson (father and son), at the time when they were commencing those labours which have conferred such a boon, not only upon that town and nation, but upon the world. A few gentlemen have instructed Mr. Craggs to prepare and fix, in front of the above-named house, a tablet of Cornwall red serpentine marble, bearing the inscription: "The residence of George and Robert Stephenson, 1824-5." The former indicates the date of the commencement of the works in South-street, the latter that of the opening of the first of the local railways, the "Stockton and Darlington."

On July 20th an International Art Exhibition will be inaugurated at Munich, and will remain open until the end of October. It will be held in a building specially erected for the purpose, and wholly constructed of iron and glass according to the plans of a local architect, formed after consultation with a committee of leading artists. One special feature is that the vestibule and the other larger rooms are to be decorated by the chief painters and sculptors of Munich, and in doing this all will work according to a harmonious design, and with the object of concealing the greatness of the wall space. The adornment of the vestibule is to be almost entirely of an architectural character, but so as to prepare the visitor for what he will see in the rest of the building. In order to lighten, as far as possible, in the case of foreign artists, the trouble of sending their contributions and of taking care of them when lodged in the exhibition, as also with a view to protecting their interests generally, it has been decided that foreign artists may exhibit "collectively," either as a nation, or in any other united capacity. This improvement on the original programme, which contemplated that all contributors should exhibit individually, is due especially to representations from Austrian and French artists, who it is reported, purpose sending large and valuable contributions to Munich.

THERE are now at least three projects for great maritime canals before the world. The nearest is the canal in continuation of the Garonne to the Mediterranean, which would render the Straits of Gibraltar obsolete in the passage from England to India, and save two or three days which are now occupied in passing round Spain. The next is the cutting of the Isthmus of Corinth, which would place Athens on the sea way from Trieste to Constantinople and greatly abridge the passage between those parts. The most distant—the proposed canal across the Isthmus of Panama—is the most formidable undertaking of the three.

AN amusing instance of an engineer being hoist with his own petard occurred at Falmouth last week. A town councillor named Thomas has complained bitterly at the council meetings of the defective drainage on the premises of a neighbour, and at the last meeting gave notice that he would move the dismissal of the borough surveyor for neglecting the sanitary interests of the town. The council thereupon passed a resolution instructing the surveyor to visit the block of buildings complained of. This was done on Thursday, and on the surveyor,

medical officer of health, and police superintendent going into Mr. Thomas's own premises they found in his cellar four tons of diseased meat, decayed cheese, and other matters, which by the orders of the medical officer were at once removed in carts to a field outside the town, and the magistrates and sanitary committee were summoned to view the collection. The magistrate at once gave orders for the whole to be destroyed and buried in quicklime in some place removed from any dwelling. This was done on the following day at the expense of the too sensitive town councillor.

A NEW railway is being made across Dartmoor for the West of England Peat Company, from the South-Western Company's station at Bridestowe to the peat beds at Rattlebrook; and last week the directors of the new railway company visited the line, which is now about half-finished. The railway is of the same gauge as the South-Western, with similar permanent way, metal, and fastenings. The total length is 4½ miles, and at its highest point—at Amicombe-hill—it rises 1,015ft. above the level of Bridestowe Station, and 1,803ft. above sea-level, being the highest point yet reached by a railway in England. The gradients range from 1 in 28 to 1 in 42. There are only two bridges. The total cost will be but £10,800; Mr. Howard is the engineer; and Messrs. Brotheridge, of London, are the contractors. It is in contemplation to use the line, when finished, during the summer months for passenger traffic, and eventually to extend it through Walkham Valley to Princetown, about seven miles from the present terminus.

A NEW hunting-ground for beating up competitors for the designing of new buildings was suggested to the Battersea vestry last week by a Mr. Gerrard. That gentleman proposed that with a view to facilitate the erection of a vestry hall suitable to the parish, and to encourage schools of design, invitations should be addressed to the schools at Lambeth, Chelsea, Kensington, and any others the Vestry might think fit, offering £50 to be divided between the three best designs. This magnificent premium was to be divided into three sums of £25, £15, and £10, in order of merit of the designs, but as the Vestry have not decided upon a site, the ingenious proposal for getting cheap designs from lads utterly untrammelled by architectural canons, fell to the ground.

WITH regard to the defects in the new town-hall at Ipswich, revealed at the last meeting of the Town Council, and to which we referred last week (p. 556), an Ipswich stone-mason, Mr. H. Jackson, has written suggesting that the state of things then disclosed should be laid at the door of the Building Committee of the Council and the architect, rather than the builder, who has nothing to do with the selection of the materials to be used. In conclusion, he makes the following suggestions:—"By no means pull down the balustrade and cornice and refix it, as was suggested in the report piecemeal, as I am sure it cannot be fixed so well again; secondly, cut out all the defective work entirely, and replace it with Portland stone, which can be done without taking the upper cornice down; thirdly, take out every cantilever one at a time, and replace them with good Portland stone, and well point up all joints with Portland cement; fourthly, the work to be well dried, then coated with linseed oil. I consider the solution of silica to be totally unsuitable for the purpose, for it has been tried in Ipswich, as well as on the Houses of Parliament in London, and has proved to be a failure; fifthly, it is very important that the Council should appoint some practical and disinterested stone-mason from a distance to superintend the work."

THE largest bridge in Europe will be completed next year. It will cross the Volga in the Government of Samara, Russia, on the Siberian railroad line. The Volga, at the point of the bridge, is about four miles wide in the spring season, and in the autumn is 4,732ft. The bridge will be supported by 12 piers 85ft. high, with ice-cutters 35ft. high, at a distance of every 36ft. The ice-cutters are covered with granite. The iron work is from Belgium. A temporary colony is established for working-men employed on the bridge. It occupies about 55 acres, and has 60 different buildings, insured at 100,000 roubles. Two thousand men are employed, and among them are 100 Italian masons. Three steamers and 70 barks are used constantly for forwarding wood, stone, iron and other materials. The bridge will cost 4,630,000 roubles, or about £700,000.

THE Hampstead Hospital case having concluded yesterday, the Lord Chief Justice, after consultation with the other judges, delivered judgment. He said the Court were of opinion that the rule for a new trial should be made absolute. The jury had been called upon to decide two main questions; firstly, whether the hospital was such a nuisance as to give the plaintiffs (Sir Rowland Hill and others) the right of action; and, secondly, whether supposing the defendants, the Asylums Board, were protected by Act of Parliament, they had conducted the hospital in so negligent a manner as to render it a nuisance. It seemed to the Court that the finding of the jury on the second issue was not satisfactory, and that shook the confidence of the Court on the finding of the jury on the first issue. So it would be better to send the case down for a second trial, with the direction of this court that the specific question should be whether the hospital constituted a real source of danger or not. The rule for a new trial was then made absolute, the question of costs of the former trial being reserved.

CARPENTERS should remember that fresh glue dries much more readily than that which has been once or twice melted. Dry glue steeped in cold water absorbs different quantities of water, according to the quality of the glue, while the proportion of the water so absorbed may be used as a test of the quality of the glue. From careful experiments with dry glue immersed for twenty-four hours in water, at sixty degrees Fahrenheit, and thereby transformed into a jelly, it was found that the finest ordinary glue, or that made from white bones, absorbs twelve times its weight of water in twenty-four hours; from dark bones, the glue absorbs nine times its weight of water, while the ordinary glue, made from animal refuse, absorbs but three to five times its weight of water.

ACCORDING to the Des Moines (Iowa) *State Register*, an architect of that city "is engaged on plans for the highest church in the world, at Naina Tal, India. It is to stand on the Himalayah Mountains, on a point 6,500ft. above the level of the sea. The directions state that the rainfall there is from 100 to 110in., and consequently the building must have wide projecting roofs and verandas, but no heating apparatus. The details are curious, as showing the difference in climate between that distant land and our own."

A new and important discovery is reported to have been made by M. Mery, a Frenchman, which, if it prove to be true, will be valuable to the painting arts and trades. He has been experimenting a great many years, and he claims now to have hit upon the means of making and applying imperishable water-colours. He does not explain what he uses as a vehicle for his pigments, but it is something which, while it will mix with water, is not soluble in it. Whatever it is, it renders the colours unalterable, and, as it becomes after a time as hard as cement or stone, they may be said to be indestructible. It

can be applied to any surface suitable for ordinary oil or water painting, such as wood, paper, glass, stone, canvas, &c., and can be prepared so as to dry in a few minutes or remain moist for an indefinite length of time. It is suggested that possibly M. Mery has rediscovered the long-lost art of encaustic painting, which is supposed to have been applied and fixed by means of heat. It seems almost incredible that a paint can be applied by means of water, and yet not be affected by it afterwards.

At the last meeting of the Boston Chapter of the American Institute of Architects, some letters from Joseph T. Clarke, junior member, were read, reporting progress in the prosecution of his archaeological researches in Europe concerning the Greek Doric Order, undertaken mainly under the auspices of the Chapter. The views of Mr. Clarke regarding the manner of lighting the Greek temples are entirely at variance with those now generally accepted by archaeologists. He argues that there is no sufficient authority, either in the remains themselves, or in the texts of ancient authors, or in medals, coins, or models, to sustain the theory of an opening of any kind in the roofs of the temples; that the famous passage in Vitruvius, upon which the whole hypothetrical theory is based, is at best obscure, and that the testimony of this author is not conclusive in regard to questions of Greek art; that the chryselephantine statues and the treasures of art accumulated in the temples were not of a nature to sustain the changes of temperature to which they would have been subjected by an opening to the outer air; that the genius of the Greeks was opposed to the use of such elaborate mechanical contrivances of shutters, &c., as must have been needed to exclude the rain and dampness from the interior; that the mystery which was a part of the hieratic system in the worship of the Greeks, as of the Egyptians, would have been far more effectively sustained by the light of lamps and torches than by the familiar light of day; that the example of the Roman Pantheon has no bearing upon the present question; that the structure of the Greek Doric temple is such that no light could be introduced through the roof without leaving large dark spaces in the area within; and that Mr. Fergusson's hypothesis of a clerestory is foreign to Greek methods, and is not in accordance with the text of Vitruvius.

It is announced that an exhibition of sanitary appliances at Cork, in connection with the annual meeting of the British Medical Association, which is to take place in the Queen's College, Cork, from the 5th to the 8th of August, 1879, an exhibition of sanitary appliances will be held in the new Palm Houses, and opened to the public during the visit. An address in the Public Health Department will be delivered by Dr. Andrew Fergus, President of the Faculty of Physicians and Surgeons, Glasgow, on Friday, August 8th, 1879. Intending exhibitors are invited to apply to Arthur Hill, at 22, George's-street, Cork, without delay. No applications can be received after June 30th, 1879.

THE Royal Institute of British Architects has been invited by the Prince of Wales, acting as President of the Royal Commission for the Australian Exhibitions, to co-operate with the Commissioners, with a view of securing at Sydney and Melbourne such an exhibition of architectural drawings as may maintain the reputation of British Art. Forms of application for space should be obtained of the secretaries of the Institute without delay, as the drawings to be exhibited must be at once collected and despatched. Should the applications for space exceed the amount of space disposable, and should it be necessary on that or any other ground to make a selection from the drawings offered, the council will act as a committee of selection.

The fifty-first election of pensioners on the funds of the Builders' Benevolent Institution took place on Thursday, at Willis's Rooms, St. James's; Mr. George Dines presided. There were five candidates, three men and two women, and there were vacancies for two men and one woman. The candidates were Gregory Bartlett, aged 75 (second application), Thomas Frederick Cook, aged 59 (first application), Jeremiah Bromley, aged 68 (first application), Susan Gulson, aged 62, widow of Thomas Gulson (second application), and Mary Ann Hibberd, aged 64, widow of Daniel Hibberd (first application). Shortly after three o'clock the scrutineers (Messrs. Thos. Stirling and T. F. Rider) announced the result of the voting to be as follows:—Cooke, 4,504; Bartlett, 3,035; Bromley, 1,077, plus 75 votes added in accordance with the rules of the Institution, to which the applicant was a subscriber for thirteen years, making a total of 1,152; Gulson, 1,561; and Hibberd, 896. The chairman therefore declared the successful candidates to be Thomas F. Cooke, Gregory Bartlett, and Susan Gulson. Votes of thanks were accorded to the scrutineers (on the motion of Mr. Cruttenden, seconded by Mr. New); to the vote-checkers (on the motion of Mr. Rider, seconded by Mr. Richardson), on whose behalf Mr. Simpson replied; and to the chairman (on the motion of Mr. Bussell, seconded by Mr. Rider).

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128, Queen Victoria-street, St. Paul's, E.C.; and
66, St. James's-street, Pall Mall, London.—[ADVT.]

The erection has just been completed in Bolton of a cotton mill in what is described as a novel style of architecture. It is six stories in height, and the dimensions of each room are 143ft. by 100ft. Instead of the usual brick divisions between the windows, light iron pillars have been used, the result being that the building appears like a vast glasshouse. It is not uncommonly spoken of as the "Crystal Palace."

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CHIPS.

An International Congress was held in Paris on the 15th inst. under the presidency of M. de Lesseps, to discuss the question of cutting through the Isthmus of Panama.

A Local Government Board inquiry was held at Bournemouth on Thursday and Friday week, before Mr. J. Thornhill Harrison, C.M., with respect to an application from the Bournemouth Improvement Commissioners for sanction to borrow £19,200 for works of sewerage and for an esplanade, and of £350 for public urinals. The plans have been prepared by Mr. C. C. Creeke, till recently consulting engineer to the Commissioners.

An inquest was held at Beeston, near Nottingham, on Monday, on the body of Charles Glasbrooke, who died from the effects of injuries received by falling from a scaffold on the previous Wednesday. The contractor, Mr. Oakley, was censured for the condition of the scaffold, which the jury regarded as insufficient, but a verdict of Accidental Death was returned.

Messrs. Chatto and Windus announce as ready for immediate publication "Church Work and Life in English Minsters, and the English Student's Monasticism," in two vols., with map and ground plans, by Mr. Mackenzie E. C. Walcott.

Owing to the suspension of Swann, Clough, and Co.'s bank, the restoration works at York Minster were stopped on Friday last.

New schools are about to be erected for St. James's parish, Darwen, consisting of large mixed school, two infant-rooms, and four class-rooms. Accommodation is provided for 600 scholars. The designs have been prepared by Mr. W. Perry, architect.

A new Conservative Club is to be built in Darwen, which will contain on the ground-floor, private billiard-room, ordinary billiard-room, reading, committee, manager's, secretary's, conversation, and smoke rooms. The second floor will be in one large room for lectures or concerts. Mr. W. Perry is the architect.

Herr Semper, the architect of the Dresden Theatre, who was considered the greatest living German architect, died at Rome on May 15th in his 77th year.

The Bishop of Peterborough presided at the anniversary festival of the Artists' General Benevolent Society, which took place in Willis's Rooms, on Saturday last. He spoke of the influence of art upon himself, who professed to know nothing about art; but this, he said, was a feeling common to both rich and poor. To the needy brethren of the chisel, brush, and pencil he held that the public, to whom so much innocent and elevating pleasure accrued from artistic labour, should extend their timely assistance.

MEETINGS FOR THE ENSUING WEEK.

TUESDAY.—Society of Arts. Paper by Edward Hinton on "The Contact of Civilisation and Barbarism in Africa Past and Present," 8 p.m.

THURSDAY.—Society for the Fine Arts. Lecture by Robert W. Ellis on "The Furnishing of Town Houses," 8 p.m.
Civil and Mechanical Engineers Society Annual Meeting.

FRIDAY.—Royal Institution. Grant Allen on "The Colour Sense of Insects: its Development and Reaction," 9 p.m.

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Trade News.

WAGES MOVEMENT.

BARNSELY.—The dispute between the master builders and the masons, labourers, and quarrymen, which has now lasted some weeks, with respect to a reduction of wages and longer working hours is still unsettled. On Tuesday, night a largely attended meeting of master builders was held. A deputation from the men attended and laid the views of the men before the meeting. A lengthy discussion took place with regard to the pending reduction of wages, the masters having given notice in the first instance that the men should work at 7½d. per hour per day, and also work half-an-hour extra per day. The deputation offered to submit to 8d. per hour and work 49½ hours per week, and be paid by the day as before. After a long discussion the masters resolved that in order to bring about an amicable arrangement they would take 7½d. per hour, and allow the men to work the same hours as before, viz., 49½ hours. The deputation not being empowered to make any such concession they left the meeting, and promised to lay the matter before the men. This was done on Tuesday night at a meeting of the men, held at their lodge-room, when no resolution was come to to accept the master's terms. Another meeting was held at the lodge-room on Wednesday, but no arrangement was arrived at.

LIVERPOOL.—An aggregate meeting of plasterers' labourers was held on Tuesday, for the purpose of "considering the recent arbitrary action of their employers in reference to wages and hours of labour." The Chairman read a draft letter which it was proposed to send to the master plasterers on behalf of the labourers. It set forth that the employers had not acted towards the men with their usual courtesy by reducing the wages and increasing the time of labour by 5½ hours without giving any notice of the change, and asked that a deputation from the men should be received by the masters with a view to the recent alterations being reconsidered.

PENRYN.—The threatened strike at the great Penryn slate quarries, Carnarvonshire, was settled last week, by the acceptance of a reduction in wages of about half-a-crown—the men to continue working four days a week. The slate trade of North Wales continues in a very depressed state.

WIGAN.—At a meeting of the master builders of Wigan and the joiners and carpenters last week, in reference to the proposed reduction in wages, an arrangement was come to whereby the men are to be paid 7½d. per hour and the week's work consist of 54½ hours, this being the basis of the award in the arbitration with the painters, plasterers, and

bricklayers. The notice by the masters was for 7d. an hour and 54½ hours per week. The masons and plumbers still remain on strike, both of these classes strongly objecting to the increase in the number of working hours.

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TENDERS.

BUNTINGFORD.—For the erection of national schools for girls and infants, Buntingford, Herts. Mr. T. Tayler Smith, architect. Quantities supplied:—

	Entire school, brick and flint.	Entire school, brick.	Girls school only, brick.	Girls school only, flint.
Chinnock ...	£1,361	£1,376	£1,261	£1,260
Cates ...	1,216		890	
Saint and Son ...	1,145	1,177	826	839
Prout ...	1,110	1,130	819	827
Lawrence ...	1,030	1,030	790	820
Seales and Norris ...	954	993	674	667

BARMOUTH.—For main sewers for the Barmouth Local Board. Mr. Thomas Roberts, Portmadoc, engineer:—

Frithard ...	£690	0	0
Tabiner ...	650	0	0
Marrow ...	610	0	0
Weyman ...	612	0	0
Imster ...	591	0	0
Morton ...	490	0	0
Dovener ...	461	0	0
Owen, G. ...	460	0	0
Beardsell ...	425	0	0
Davies ...	395	0	0
Hughes ...	385	0	0
Jones ...	387	0	0
Braddock ...	371	0	0
Owen, E. ...	370	0	0
Morgan ...	370	0	0
Owen, S. (accepted) ...	320	0	0
Jones, E. ...	291	6	0

[Engineer's estimate £503.]

CALDECOTE.—For alterations and additions to Caldecote Hall, Warwickshire. Messrs. E. J. and J. Goodacre, architects, Leicester:—

Lovatt, Wolverhampton ...	£26,672	0	0
Everett, Colechester ...	24,949	0	0
Webb, Birmingham ...	24,070	0	0
Bromwich, Rugby ...	23,746	0	0
Barnsley, Birmingham ...	23,378	0	0
Herbert, Leicester ...	22,525	0	0
Parnell, Rugby (accepted) ...	21,846	0	0

CANTLEY, NORWICH.—For new roof and other works to chancel of Cantley Church. Mr. J. Wm. Cockrill, architect, Gorleston, Great Yarmouth:—

Hawes ...	£430	0	0
Wegg ...	385	0	0
Durrant ...	378	0	0

CREMINGTON.—For repairs to a chapel at Crediton, Devon. Mr. James Crocker, architect:—

Inch ...	£25	16	0
Bntson and Son ...	22	0	0
Brook (accepted) ...	20	0	0

CHISWICK.—For finishing two semi-detached villas. Mr. Richard Tomlinson, architect, Gunnersbury:—

Winter, A. ...	£1,200	0	0
Haynes, H. ...	1,177	0	0
Brown and Pank ...	1,175	0	0
Wickham, E. ...	1,050	0	0
Willett, W. ...	890	0	0

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THE BUILDING NEWS.

LONDON, FRIDAY, MAY 30, 1879.

THE STONE-YARD OF FRANCE.

THERE is no material in existence representing a greater variety of quality, use, and substance, than stone, though a history of it, in its innumerable applications, has never been written. The effect of its presence, in, or absence from, a country, is of course, most marked in the architecture, and even the manners of the inhabitants, and this has been nowhere more apparent than in many parts of England, including the metropolis. But to few territories of Europe is the stone supply so important as to France; though even the French, with their abundant command of the material, have made frequent failures in building, owing to the defective character of their quarries. Thus, the Palace of the Institute, at Paris, within a few years of its erection, began to exhibit signs of hopeless decay; though, as a parallel fact, it must be admitted that even the tomb of Napoleon, originally supposed to be among the most perfectly elaborated structures in the world, is being eaten away by that which French naturalists describe as a species of stone spider. This uncertainty with respect to the solidity of the public buildings erected of stone wrought from their own quarries, led the French architects, so far back as 1678, to insist upon a report on the subject from the Royal Academy of Architecture at Paris. It was found that some were suffering from what was called "stone disease"—*mal de la pierre*—a term afterwards applied to people with a mania for building; others were so soft as to be actually flexible; a few were spongy, and required to be solidified by artificial processes; and many could not withstand the action of rain. Such was the statement made, on high professional authority, two hundred years ago. A good deal of practical knowledge, connected with the whole matter, has no doubt accumulated since then; and we possess, indeed, a set of documents in which the entire stone-producing capacities of France are reviewed—from the yield of Changelade, harder than the Egyptian rock, to that of Crupol, pliable as "Calcutta marble;" from that of Coirtenoux, resembling exactly the lava of which the Chiamonte Palace at Palermo is constructed, to that of Vergelée, which supplied materials for the new staircases at Versailles. A curious circumstance is that this latest report coincides precisely with one that was drawn up in 1680, concerning the churches of Blois, St. Victor, and Menar, the descriptions of the stone being the same—tender, easily wrought, capable of an exquisite finish, but destined to early decay, as is evidenced by a multitude of dilapidated edifices in the valley of the Loire. The stone, again, of Apremont and of Charite has not changed its reputation in the least, but is still invariably in demand where deep foundations have to be laid for the sustaining of ponderous superstructures. Thus, moreover, we find the ancient quarries beneath the Faubourg St. Jacques, in Paris, represented to this day by most of the antique hotels in that quarter; while, on the other hand, for the construction of their bridges, the Parisians have immemorially resorted to the hard and finely-grained rocks of the Jura. But, for the kerbs of their canals and the masonry lining their gutters, the French builders have generally preferred to employ stone from Coirtenoux or Monasse, on account of its being, at the same time, porous and durable, the same reasons explaining its large use in the exterior cornices of houses;

though often, after a few years, this material exhibits on its surface a sort of efflorescence rapidly converted into decomposition. An examination of monuments, two centuries old or more, has also aided the official investigators in determining the permanent value of the various quarries in France. Many they found intact, and these in Paris were built, for the most part, of the stone which French builders call *Liais*, abundant beneath the metropolitan faubourg of St. Jacques, at Chartreux, and the environs of Arancil and Creteil. It is not merely used for foundation walls, but also for chimney-heads, coping-stones, gutters, balustrades, columns, the pavement of crowded crossings; it can bear almost any amount of wear and weight, and can only be wrought into shape by the most powerful tools. The Holy Chapel, at Paris, constructed entirely of this material, is to this hour without a flaw, except where the iron clamps have rested. But in the Cathedral of Notre Dame itself, with the same substance employed, only in parts of the edifice, however, by the architects, a singular result has been obtained. Those surfaces which are exposed to the air betray few signs of decomposition, while those of the interior, acted upon by neither air nor rain, are worm-eaten, so to speak, to a lamentable extent, reduced to an extreme thinness, and even worn, here and there, as in the pavement, into holes. This is explained by the extraordinary fineness of the pores, the water which penetrates the exterior surfaces being easily evaporated, through the action of the atmosphere and the sun, and it is remarkable that the decay is more rapid on those in the interior where they are laid on beds of mortar. The solid brown-tinted stones of the Burgundy quarries are therefore recommended for this kind of work, rather than the whiter qualities of, for example, St. Leu, full of salt-petre, chalk, and sand, which are beautiful for a time, but speedily crumble, like what are styled "the rocks," or "mill-stone rocks" of Paris—very valuable for foundations, but worthless for building in the open air. Much of the stone in the rocky basin of Paris presents similar peculiarities; it can bear rainfalls in any degree; but it yields to anything like a continual drip. For pinnacles, cornices, crests, and roof decorations generally, we are told, the quarries of the Oise Valley are incomparable, with their blocks of porous, sonorous stone, which are difficult to chip, and never wear away in scales; which absorb quantities of water while lying in their natural beds, and eject it upon coming into contact with the atmosphere, forming a kind of crystallised casing for themselves, of considerable importance to the builder, if advantage be immediately taken of it—preventing, as it does, the process called "death," to which so much of the stone found in France is liable. The French capital, of course, has long been dependent, in a large degree, upon the provinces for its supply of building materials, and these are brought, by canal for the most part, in enormous quantities from Soissons and Chatillons, from the Manse, Dornecy, and Ravieres, the latter being especially prized for the dimensions of its blocks, their durability, equality of grain, and uniformity of surface. That of Soissons is heavy and takes an exquisite polish; the "rock of Farget," almost resembles marble, and is in great request for stairs and steps.

The objects of the inquiry, now still going forward, include the general amount and probable duration of the supply—for that quarries may be over-worked to a dangerous degree is demonstrated by the example of Paris itself—the resisting power, both as to crushing, as to damp, and as to atmospheric influences generally; knowledge of the highest importance, say the authors, both to the architect and to the practical constructor. Next in order rank the grain

of the stone, the local processes of quarrying, and illustrations of its local employment, with the dates of the various edifices in which it has been used, and their condition at the present day. The inquiry instituted by Colbert, as we have said, in 1678, resulted in a report of 125 sections; that now in progress will probably double the number. The French naturally set great store by their supplies of stone, and point to England as an instance of a country without a sufficiency of this material. They dwell upon the construction of our castles, which, grand though they were, consisted chiefly of heaped up pebbles and mortar, and affirm that the basement of Westminster Abbey itself rests upon no more than a foundation of concrete. Yet they are themselves fain to confess that a good deal of what passes for stone in France is little better than a sort of white or yellow chalk, or, as it were, petrified clay, from which porcelain is made, though it is easily worked into temporary building forms, great quantities of this being used up in the Parisian suburbs, from the valleys of the Loing and Yonne, as, of course, it is far cheaper than the solid substance, still be excavated at Courtagnon, near Rheims, and even Grignon, near Versailles, whence were obtained the materials employed in the construction of their masterpieces by Lamarch and Deshayes. Similar, though superior, are the so-called "stone pits" along the banks of the Marne, at Champigny, at Montmorency, and at Beaune. When, however, we are to compare these doubtful productions of the soil with the tomb of Napoleon, though even that has not escaped the first symptoms of ravage, it must be remembered that this is by no means exclusively French. It is true that Italy, Greece and Egypt failed to supply the mass of porphyry that was wanted; but the principal block, after all, came from the unexhausted quarries of a northern region. France, however, as we are reminded, possesses valuable treasures of this description. There are both red and white porphyry in the Vosges mountains, in the valley of the Loire, near the town whence Chateaubriand took his title, blue porphyry in the Var, the kind known as basalt porphyry in Auvergne, the green qualities in Brittany, the gray at Metz, and the yellow in three or four departments beyond the Marne. In fact, an idea may be formed of the riches possessed by France in her quarries from the digest prepared by M. Hélicart de Thury, for the information of the Government Commission. He shows that in 80 French departments marble, in more or less excellent quality, is found; while red, black, green, brown, violet, blue, and amber porphyries are obtainable from no fewer than 30. Perhaps more valuable than either is the stone known to French architects as *vergelée*, exceedingly solid and heavy, excavated in immense abundance at St. Maximin and St. Leu, of which were built in great part the famous Chateaux of Gaillot and Anet, and the magnificent Cathedral of Rouen, and of which several cargoes were exported across the ocean to assist in building the Imperial Palace of Brazil, at Rio Janeiro. The inquiry, however, ranged to artificial as well as natural stone, and some points in connection with this are of interest. It is shown that sundry well-known monuments, generally believed to be monolithic, are actually composed of "granite paste," a substance which defies the weather for an extraordinary length of time; yet this is a topic apart, and does not directly bear upon the riches in stone scattered over the French territory. It is a fortunate circumstance for the internal trade of the country that neither the demand nor the supply are ever purely local. Of course, the peasants everywhere construct their cottages of the materials readiest to hand, so the character of the neighbouring quarry imprints itself upon the abodes of the people

for miles round in every stone-working district; but certain kinds, only to be found in particular localities, have a special value assigned to them in the building of belfries and church towers. That of Vineuil is sought for to be employed in ornamental pavements; that of Vidy for the lintels and jambs of doors and gates in large country houses; that of the Jura, as we have observed, for bridge-building, in Paris particularly; and that of Clignancourt for cisterns, or wherever the action of water has to be continuously sustained. France, it is to be remembered, possesses very little slate—none at all, it may be said, of the first quality, though the quarries of Agens yield considerable quantities for the roofings of chateaux, turrets, and wherever the Louvre style is adopted. Lead, however, has of recent years been extensively adapted to this purpose, though by French architects, it is almost universally disliked. It is not even attempted, even by those who have been submitting the whole subject to analysis, to suggest an approximation to the actual value of the French stone, marble, and porphyry quarries in the aggregate. It would be like taking stock of the English coalmines. But they may be regarded as being, taken for all in all, practically inexhaustible, and there can be no denying the influence they exert upon both public and domestic architecture in France. Their variety is as great as their range is unlimited, and there is not a cathedral, palace, municipal edifice, ancestral mansion—scarcely a house in a town, or a hamlet in the country—but what testifies to their existence, and to the large part they play in the national life. France, so to speak, lives in a house of stone built out of her own soil, which accounts for a thousand characteristics visible to the traveller.

THE WESTMINSTER INDUSTRIAL EXHIBITION.

FROM a small and humble commencement made last year, the Westminster Industrial Exhibition has this year grown to dimensions that bespeak the success of the enterprise. The idea of an artisan exhibition that shall become an incentive to good workmanship, industry, and inventive skill, and which shall, by prizes judiciously bestowed, offer an inducement to the working man to employ his spare hours with intelligence and profit is itself undoubtedly excellent; though we think there is one possible danger to be guarded against by the promoters of exhibitions of this sort, namely the extolling of mere mechanical labour at the cost of intelligent thought and art skill. There is frequently the mistake made of rewarding the exhibitor's manual dexterity, his capability of turning out models of buildings and steam-engines, in which every feature and screw are reproduced with marvellous fidelity and minuteness, or the laboriousness and patience spent upon a piece of inlaid work in which the design has been made a secondary consideration. We certainly object to anything which may have the effect of making men skilled automata rather than thinking artists. The exhibition at Westminster is largely made up of objects contributed by artisans and amateurs. Of course both kinds of industry should be encouraged within certain limits, and it is the need that both should be placed upon their own merits that have prompted us to the above remark.

As we have already spoken of the very effective temporary buildings erected in Victoria-street from the designs of Mr. John P. Seddon, the honorary architect, we may now take a rapid glance at the show, which was opened last Saturday afternoon by the Speaker.

Of the varied and rather heterogeneous collection the "mechanical" almost neces-

sarily occupies a very large portion, comprising such objects as cabinets and inlaid tables, wood and ivory turning, musical instruments, cane work, models of steam-engines, carriages, buildings, &c. In this department we notice some excellent specimens of cabinet work, evincing technical skill of a high order. We are struck with bookcases, inlaid tables, and fancy boxes of a kind that compete with many of the best productions in the trade, though here, as in other classes, the difficulty is to distinguish fairly between the work of professed workmen and amateurs. We notice a bookcase of pollard oak, by G. Bates, with traceried panelling of Late Gothic, excellent in workmanship; a workbox (No. 18); tables and stools (No. 29); a satinwood jewel-case (56); an elegant inlaid pier-glass frame (58), in which both the form and inlays of tulipwood and walnut are commendable; a work-table (46), all being the works of carpenters and cabinet-makers. Nos. 53 and 84 are both pleasing cabinets; and so is 61, an overpiece in walnut. The work as a whole of this kind is certainly much in advance of previous efforts. In style and design there is more taste displayed, if even yet that taste seems to lack expression and the refining influences of art instruction. The faculty of pains-taking is indeed prominently manifest, the one want being intelligent meaning and self-reliance. No. 83, a specimen of "double quadruple dovetailing," &c., is an exceedingly skilful piece of joinery, in which no effort is made beyond the mechanical, and we can appreciate the labour and industry at its full value. More numerous are specimens where the motive of the workman is not so apparent, where neither use nor beauty is aimed at except a sort of unmeaning desire to show a trickster's cleverness. These comprise puzzle-boxes and other ingenious but useless kind of models. As an instance we notice No. 545, a large shellwork model of a cathedral front, composed entirely of shells, by G. Mawson, plasterer, which has taken its author 34 years, being begun in 1842. It is intended as a bird's nest! Extremely interesting as an example of plodding patience and untiring industry, we must yet deplore the waste of skill and time over a useless object no less purposeless in its intention. The thought strikes one how much more usefully the spare moments of the 34 years might have been spent. Very different is such a model as No. 211, to which the judges have awarded the gold medal, namely, a locomotive engine and tender, by R. Arkwright, of Herne-hill; or those models illustrative of apparatus for saving life from fire and at sea, Nos. 491 and 492, 498, 500, 504; for railway brakes, or those showing improvements in casement and sash-fastenings, in kitcheners to roast by reflection, as in 343. We note several ingenious models, such as 509, a recording thermometer to register by electricity; a chronometer escapement, 521; but we pass on to notice the products which fall under the head of "Artistic." In ivory and wood turning are to be seen many clever specimens. We note No. 103, a turned bowl, oval in shape and well-moulded; some frames and medallions in boxwood (133) by a carver's apprentice; an over-mantel (138); Bacchante's heads and a girl's head in relief, No. 154. In terra-cotta, H. Gunthorp, in 561, sends some clever and spirited specimens of modelling. We notice "Samson Slaying the Lion" as especially vigorous, and a few cleverly carved stone circular panels with animals (593); but, as a rule, despite the evidence of industry, the work in this class falls from the evident desire to produce something skilful as a piece of handiwork only, without an insight into the first principles of modelling in relief, or a due regard for outline and composition in plastic art. The vases, fountains, brackets, and statuettes generally evidence technical skill, but nothing

beyond. In the marble exhibits the same fault pervades the objects, and the commonplace and misdirected invention are predominant. Painting on glass and china has received some attention. No. 909, hand-painted plates and tiles show some tasteful designs. We note a few plates in which plants are introduced in the Japanese style, one by F. G. Malins. No. 906, china plaques, by Mary Dentone, of Lordship-lane, are very good examples; and another, in which lilies are painted upon plates, by Mary Glossop (1560). We notice also 924. A few good specimens of glass-staining are to be seen. Turning to architectural designs, we find this class of work is not numerously represented, though a few exhibits call for remark. We observe especially a series of working drawings by students of Nine Elms, Southwark, Stepney, Greenwich, and other science schools, which have been done under the guidance of Mr. Parton Parry, displaying considerable merit and technical knowledge. Mr. A. T. Broadhurst also contributes eighteen drawings. We may mention geometrical elevations and sections (coloured) of Tenterden Church, Kent, executed by the Southwark Science Class, as careful delineations of measured work. No. 873 shows a coloured design for a residence by E. Daymond, builder's surveyor, of more than usual merit. It is of red brick, with stone dressings, in the Italian style, the chief fault being a rather heavy and lavish use of ornament round the windows. Among other exhibits we note a design in monochrome (874) by G. J. Daymond, architectural sculptor; three designs by H. Edwards, draughtsman; water-colour designs for interior decorations, by A. E. Lowe (890); an arabesque over-door; drawings for tile floors; design for a country residence, by T. Sims, architect's assistant; brickwork details; a series of 20 well-executed drawings, by J. Woodley, bricklayer, clerk of works, Brixton, showing construction of niche and ornamental brickwork; another set, by F. Stocker; designs for workmen's dwellings, by F. Witt, clerk; drawings by J. Taylor, draughtsman, &c. "A design for church," coloured, like many other of the designs, exhibits the usual ambition, and redundancy of ornament is the besetting vice. We observe, in looking over the catalogue, several designs have been contributed by other than architects' assistants, one exhibit being by a merchant's clerk. Oil and water-colour paintings make a rather large class, though the exhibits are unfortunately mixed up with other work which rather distracts the eye for picture viewing. We have oil-paintings by opticians, newsagents, stone-masons, letter-carriers, carpenters, commercial travellers, and bill-posters; so it is certainly one of the departments which have not been wholly given up to professional experts. Mr. H. Major takes the first, and Mr. Gare, a jeweller, the second, prize in this department. Some of these exhibitors are very prolific; thus, there are three oil-paintings by W. H. Ball, newsagent, and no less than eight by T. W. Colley, a harness-stitcher; in these, as might be expected, enthusiasm and a mistaken zeal for art are the chief recommendations. As examples of untalented talent which our schools have not reached, some of them exhibit decided ability, and the only regret we feel is that so much labour has been expended without direction. In the water-colours we notice No. 726, a river piece, by E. Ferris, designer, who wins the first prize. This is a carefully-executed drawing, and there are several others that display considerable feeling for colour, though the work of men of very humble position. The chief faults observable in this department are imperfect drawing and perspective, and a garish sense of colouring, that only requires the training of a school or a good master to correct. The pen and pencil drawings are very numerous;

the exhibitors are from every rank of life, from the artist to the dock-labourer. It is impossible to estimate the actual art capacity of any exhibitor when many of the drawings are the works of draughtsmen on wood and professional artists. Illuminated texts and specimens of ornamental writing are, as usual, in abundance, but we especially note 961, "A Manuscript Book on the Antiquities of Kent," by W. Dampier, a clerk, of Bermondsey, containing 420 pages of closely-written description, interspersed with 300 sketches in sepia and pen-and-ink—a work of credit and of immense labour. We can only further notice some specimens of graining and marbling, some excellent goldsmith's metal work, a few flower-boxes and aquaria. Of the last, Nos. 1,034, 1,037, and 1,044 are pleasing combinations of both, while the ladies' department in embroidery and needlework must not be overlooked by the visitor, numerous specimens of wool pictures and flowers, crochet and knitting enlisting attention for the unsparing labour and, in some cases, taste they display. The arrangement of the area and the covering of the central space by a series of three parallel canvas buildings produce quite a bazaar-like effect, and we are sure those who have any doubt about the industry of the working man will be agreeably disappointed by a visit to the Westminster Exhibition. The one impression the show leaves upon us is that the art teaching of our schools of design has something more to accomplish in reaching the class of workers who contribute to these exhibitions—at present the only step they possess towards advancement. We have indeed ample raw material, skill and industry, awaiting only direction and aim.

JOHN B. PAPWORTH, ARCHITECT.*

AN interesting chapter in the history of the architectural revival has been reopened by the publication for private circulation of a memoir of the life and works of the late John B. Papworth, architect to the King of Wurtemberg, by his son, Mr. Wyatt Papworth; and we have pleasure in laying before our readers a few incidents in the career of a man who in his time and generation contributed not a little towards that revival of taste which has culminated in our own day. Mr. J. B. Papworth, the father of the respected firm of architects who for a long period carried on together the business left to them, but of which now only one member remains, commenced his career in the same profession at the beginning of the present century, or rather saw the last decade of the 18th, and the first half of the present century. We may just glance at the circumstances of the period so eventful in the history of the arts. Mr. Papworth began to study his profession when Sir William Chambers, Sir J. Soane, Sir Robt. Smirke, and Mr. James Wyatt were in practice, and was connected with the first and last architects. The Greek revival had just begun to make its influence felt, while Mediaeval art was also beginning to exert an enthusiasm in another direction. Mr. Papworth followed the Italian, and was one of the first of the Greco-Roman school. Intended for the study of surgery, which he gave up from a strong predilection for architecture, we are told in the autobiographical sketch that this bent was determined by a visit to the little theatre in the Haymarket, where there was at that time (1787) a drop-scene, painted by Michael Angelo Rooker, of a Corinthian colonnade and court of a palace. Being the first glimpse the young Papworth, then a school-lad, had of a theatre, the sight struck him so much

that he drew it on the next day, and as he was finishing it Mr. Wilton, the sculptor, was so pleased with it that he took it to Sir William Chambers, and on the following day he accompanied the boy and his drawings to Sir William, who was then living in Berners-street. After this Sir William became a friend of young Papworth, lent him drawings to copy, and it was by his advice that the youth was placed under the tuition of Mr. John Plaw, an architect, during which time he was instructed in the art of perspective by Mr. Healy. The study of the human figure also engaged the young student, who received lessons from Mr. John Deare, sculptor, a gentleman sent to Rome by the Royal Academy, and accompanied M. Rossi, both being recipients of the medal that year. At the age of fifteen, we learn, young Papworth was skilled in architecture and perspective, ornament, the human figure, and modelling. These art requirements were supplemented by a practical knowledge of construction and building, which he learnt from Mr. Thomas Wapshott, an eminent builder with whom he was placed for three years. At this period (1788) Covent Garden Church was repaired, and in 1795 it was rebuilt, from Mr. T. Hardwick's designs, by the same builder. "During this time," to quote the autobiography, "Mr. Papworth sent several drawings to the Royal Academy exhibitions"; and before his term had expired he was induced to study internal decoration and fresco work, then lately introduced from France by Mr. Sheringham, of Great Marlborough-street. After this Papworth became clerk of works during the erection of a residence built for Sir James Wright, Bart., at Woodford Bridge, Essex, called Ray Lodge. These incidents in his earlier life we have taken from the autobiography to which we refer our readers, and we may gather from the above particulars that the education of the architect at this early period was far more perfect than it is now. It is worthy of remark that architecture has been the hereditary profession of the Papworth family. Mr. John Papworth (the father of the subject of this memoir) was a master plasterer and stuccoist—one of the tradesmen of the Office of Works—and was called by his numerous staff of workmen, "architect, plasterer, and builder."

Paddington Church is one of the executed designs of Mr. Plaw, the master of John Buonarotti Papworth, and it is surprising that an architect of the undoubted taste of the subject of this memoir should have been his pupil. The sources of his architectural instruction and inspiration, were doubtless a self-acquired taste, founded upon such works as Stuart and Revett's "Antiquities," Nicholson's "Architecture," Alberti's and Chambers' treatises, and the abridgments of Palladio then extant, though no doubt the works of his friend, Sir W. Chambers, and other eminent architects of the day, had a considerable share in helping to form his taste. Mr. Papworth lived for a time at 30, Great Portland-street, the residence of his father; he then took a house in George-street, Adelphi, and subsequently resided in 6, Bath-place and Caroline-street, Bedford-square. He married a daughter of his former master, Thomas Wapshott, but soon became a widower, afterwards marrying the eldest daughter of William Say, mezzotinto engraver, herself a skilful musician and artist. The "experiences" recorded by one of Mr. Papworth's pupils, Mr. James Thomson, while in his office, fill up an important gap in the career of this architect. We find Mr. Papworth here spoken of as a distinguished exhibitor in the Royal Academy, and in the Architectural room at Somerset House, and several of his earlier works are noticed. Among country residences we find mentioned the villas for Sir David Wedderburn, at

Chigwell; for Mr. George Dorrien, Mr. Burnmaster, and other City magnates. He also designed the Earl of Lucan's house near Staines, the engineering factory for Mr. Alex. Galloway, in West Smithfield; a house for Mr. Herries, banker, the garden-seat at Claremont for John W. Hiert, afterwards converted by Prince Leopold of Saxe Coburg, a mausoleum erected by Whitelaw at Knebworth, the residence of Sir E. Lytton Bulwer. In 1813 his artistic talent was employed in the building of the large room at Mr. Ackermann's house of business in the Strand, which was a repository of art; but his most complete works were Leigham House, Montpelier Spa, Harley-street, and Basildon. The Harley-street improvements and decorations made for Mr. James Morrison in 1831 brought Mr. Papworth's ability and taste as an artist in decoration prominently into notice. The rich caissoned ceiling of the gallery of the first floor, the library and its fittings and furniture, were for the time models of elegance, and it was at this house Mr. Morrison, then M.P., received the council and members of the Institute of British Architects at a conversazione in July, 1840, Mr. Morrison having become an honorary Fellow on his architect's recommendation. Evidence is not wanting to show that Mr. Papworth was a thoroughly conscientious architect, scrupulously particular in the forms of his mouldings and the carvings and modelling employed in his work, all of which he required to be submitted to him before approval. In 1829-32 we find him engaged in the design of alterations, at Holt in Norfolk, of a Domestic Gothic residence for Charles Nevill; and in 1830 he modernised the mansion at Cally in Scotland, for Alexander Murray, of Broughton, son-in-law of the Earl of Lucan—one of Mr. Papworth's best works. He was continuously engaged in the design of works of decorative character, garden accessories, fountains, conservatories, furniture, which we cannot particularise here. Mention is made of his employment at Fonthill; and we find him in 1838 engaged in modernising and decorating "Basildon" for James Morrison, formerly the seat of Sir Francis Sykes, Bart., and originally designed by John Carr, of York. Mr. Papworth was one of the first who promoted a professional society which ultimately developed into the Institute of British Architects, and in 1847 his admirers and professional friends presented to him on his retirement from practice a silver inkstand as a "tribute of respect and esteem for his talents as a distinguished architect, and for his worth as a man." This is signed by all the leading architects, including T. Allason, Charles Barry, R.A., T. Bellamy, C. R. Cockerell, R.A., T. L. Donaldson, &c., &c. Professor Cockerell presented the testimonial on Mr. Papworth's seventy-second birthday in a speech of some length, in which the reasons which prompted the presentation are dwelt upon. In this speech Mr. Papworth's reputation in a practice of fifty-five years for delicacy and purity of taste is spoken of; also his zeal as the promoter of the Government School of Design, and his endeavours to promote the union of landscape gardening with architecture. Among his pupils we find the names of Samuel Benwell, who died early; his own brothers, George and Robert Papworth; James Thomson, William Adams Nicholson, Charles Edwards, John Douglas Hopkins; while of his assistants, the names of William Knight, G. H. Stokes, the late George Guillaume, architect, of Southampton, and Thomas Latter, are mentioned. To his credit, Mr. Papworth personally instructed those in his office, and we have heard one of them say that he spared no trouble in explaining designs to his pupils and clerks, who were invariably treated by Mr. Papworth as gentlemen and always welcomed to his house. Mr. Papworth died in 1847,

* John B. Papworth, Architect to the King of Wurtemberg. A brief record of his Life and Works. By WYATT PAPWORTH. London: Privately printed.

at the ripe age of 72. Those who are engaged in tracing the historical growth of modern architecture will find the fragmentary sketches and private papers brought together by Mr. Wyatt Papworth of much value and interest; many of the pages contain Mr. Papworth's own remarks, and, to many architects who remember the period we have referred to, the incidents recorded will have more than a transitory interest.

THE INSTITUTE OF ART.

A NEW exhibition of a very laudable kind has just been opened in the large gallery of 9, Conduit-street, and if we cannot say very much for the first year's collection it must not be inferred that it is not worth a visit. The Institute of Art is apparently a new society which has undertaken the promotion and encouragement, by the aid of prizes and otherwise, of ladies' art work—needlework, painting in oil and water-colours, china painting, modelling, wood-carving, &c., being among the classes of workmanship admitted. Membership is placed upon easy conditions, the only requirement being a subscription to be paid optionally, and that the work exhibited be the handiwork of the respective exhibitors. The right of competing for prizes and certificates is confined to members, though no prize-winner is eligible for more than one prize in the same class, and no member may exhibit free of cost more than four articles. The objects sent for exhibition may be marked with the prices at which they may be sold by the society, and these must include a commission of 10 per cent. for the society, of which 5 per cent. is given to purchasers in the shape of reimbursement coupons. The strength of the present exhibition lies in its needlework, and in this class there are some very creditable evidences of taste and skill—wool-work and crewel-work, lace and embroidery making up a large part of the exhibition. In Class H., "Designs for work," we meet with some pleasing crewel-work, one showing tufts of grass, by "A.M.C." Some designs for curtain embroidery to be worked in appliqué satin and silk is too naturalistic in the design. The Cherwell water-lily table is a pretty conceit, and a Japanese screen is worth notice. The colouring in a few instances is garish, and on the whole it must be confessed the work in this department indicates copyism rather than original design. A tablecloth by Mrs. Dymock is an excellent specimen of decorative needlework. The colours are deep, chocolate and a peacock-green border with white oval-shaped medallions on it. We believe this takes a prize. We note a piece of crewel-work upon blue cloth by Mrs. G. A. Jones, also the figure of a gleaner well-drawn and worked in dark brown by Miss Hope, with considerable care, and a design from nature in crewel marked "E.K." In lace and embroidered work we must not overlook some beautifully-executed Honiton lace flounces by "E.A.," also one by Miss Whitehouse, and some point lace by Miss Parkes and Miss Scott. A child's embroidered robe made in Constantinople at the beginning of this century, and a silk embroidered front of dress, by M. Turnbull, on white satin—the latter wins a prize—claim notice as rich specimens of embroidery. In paintings on fabric we observe a large coverlet with a very confused pattern in which birds and flowers are mixed together in an inextricably confused manner. If we may pass an opinion, the embroidery generally shows a lack of art principle, the patterns in many of the examples are stems and flowers drawn in a too sprawling, aimless manner, and in very few is the attempt made to conventionalise the natural forms. We do not like to criticise the paintings in oil and water-colour; but as first contributions we cannot say much about them. Lady Dunbar, who sends a

few things in needlework, contributes some of the best water-colour sketches. We note two pictures, also "Villa Borghese and St. Peter's," and "Castle of Angelo, Rome," by Miss Riddell; an expressive portrait, side-face, by M. James; "Blackberrying on the Lluger, N. Wales," by Miss J. W. Currey, and a sketch of the Small Canal, Venice, by Miss Lucas. In oils the first prize has been given to a view of a cornfield by Miss S. E. Whitehouse, a lady who also exhibits some exquisite point lace, and M. Currey's "Apple Blossom" also receives a prize. Miss A. K. King's "Shoeing the Bay Mare," after Landseer, is creditable as a laboured copy, "Rocky Pastures," by Alice Green, is more promising, but the "Irish News Boy," by Lady N. Newenham, falls short in drawing. In the painted china a few meritorious works are to be found. For instance, the painted plates signed "K.V.D." has a cleverly-designed group of figures in brown upon a blue ground; another by Miss S. M. Allen is skilful in the arrangement of the peacock's feathers, three of which are placed across the plate, and Mrs. Swain, Brixton, exhibits some very characteristically-painted plates in the Japanese style. The tile painting of Miss Lewis (Doulton and Watts) is vigorous in drawing and colour—a deep red chocolate or maroon being the ground. Miss H. Barlow, a well-known artist, sends a grey and deep blue Doulton vase, in which there is little to find fault with, either in design or colour, and another by the same lady, larger, is also excellent. A vase with blue flowers of a lily type painted on relief must be noticed, and in this department we hope the institute will continue to gain accession of art skill. We cannot mention other exhibits, such as screens, painted and worked fans, carved woodwork, illuminated texts, and old needlework, which fill up the walls and tables, but we congratulate the Council of the Society upon the success of this experiment and the number of works they have brought together, feeling sure that the existence of a society founded upon liberal principles of encouragement will meet with the public support it deserves.

ART APPLIED TO CONSERVATORIES.

IT is a standing reproach against the art of the modern architect that he cannot design a satisfactory conservatory. Very few indeed of the many residences and villas that have been built of late years can show a pleasing connection between the house and this indispensable adjunct. We either see no attempt made to assimilate the two structures, or else the conservatories are designed to resemble Classic temples, mosques, Swiss chalets, and other forms of structure that are supposed to agree with the style of the building. Messrs. T. H. P. Dennis and Company, horticultural builders and engineers, of Mansion House Buildings, E.C., have published Part I. of a catalogue entitled "Art with Economy applied to Conservatories," in which no less than 20 designs for conservatories, with plans, are given, many of them sensible and artistic. In the opening remarks, Messrs. Dennis and Co., observe that they intend to compile in future issues "designs of such originality and merit as will be calculated to secure the approval of the art public, together with the requirements of the profession." The idea of making the construction artistic instead of constructing false ornamentation, is undoubtedly the right one in a conservatory, as in all other buildings, and we confess that in the bulk of the designs in the catalogue of Messrs. Dennis the principle has not been lost sight of. Another equally desirable principle is that a good conservatory should grow out of, and be really an extension of, a reception-room or hall, and this also has been kept in view in all of the

designs. We are glad to see, for instance, in plate 12, the conservatory is shown in a proper relation with the lobby and dining-room. In the next example given, it leads out of the drawing-room, while in a few it is placed in a corner, between the hall and drawing-room, with either or both of which it can be brought into communication by casements. A lobby or fernery may be made a very pleasant means of uniting the two rooms, and we notice some of the sketches show how this may be effected. We believe that it is much better to make this class of structure quite independent of the house in its architectural lines, than that an effort to unite them should be visible when they cannot be agreeably combined without resort to expensive and undesirable expedients. Thus a flat roof disguised by a cornice or pediment is to be avoided if economy is aimed at, and it is far better to connect the room to the conservatory proper by a lobby or short corridor, making the structure itself quite independent in form. We find one or two designs in the book which meet this view of the case; thus Plate 18 shows an octagon plan joined on one of its sides by a short lobby in communication with the drawing-room, and in which lobby an outer door is placed. The octagon is roofed with a lantern. That most awkward of all problems, the design of a Classic conservatory is worked out with much taste in Plate 19; the plan is rectangular and is made to occupy an angle between a drawing-room and study. The roof is flat in pitch and the central span is connected with the building by a small flat roofed side-wing which occurs on each side. By this arrangement the rafters are not cut off on one side against the house and a more architectural connection is made. A considerable variety of ground plan and roof treatment is possible in this way, and an unpleasant effort to unite the buildings avoided. We are glad to find wood is largely used in these structures, and that the mullions, transoms, and sash bars are arranged with some eye to artistic combination and effect. The upper panels of the side lights can be easily made to contribute both to ventilation and ornament, and in some instances, iron frames of ornamental design can be introduced between the piers, or uprights, as we see illustrated in plate 13. The designs are in every conceivable style, Classic, Queen Anne (a style which may be made to lend itself easily to these buildings) Jacobean, Gothic, and Old English, &c. A suggestion is made, which is worth the consideration of those who are about to build a house, and that is, that provision should be made in the plans for the flue of a heating apparatus, a point that, however obvious to the practical builder, often escapes the architect's notice. It may be well to say also that the same apparatus can, if properly devised, be made to heat both the house and conservatory. Messrs. Dennis' tubular boilers are powerful and rapid in their heating, and we understand a combined heating and ventilating apparatus will shortly be introduced by this firm. Several designs for greenhouses, with prices for varying dimensions, are given, which will be found of special use to the profession and the public. Thus we find a span greenhouse made of the best red deal, with rafters 4ft. apart, and the roofs fitted with glazed lights cut, from 2in. thickness, 20ft. long, by 14ft. wide, costs £56 4s. These prices are exclusive of men's time and fixing, painting, brickwork, heating apparatus, and staging. Iron and steel construction is referred to, and a design for a range of conservatories in these materials accompanies the work. A copious list of "clientèle" is appended, from which we find that the endeavour of Messrs. Dennis and Co. to combine art with economy in this class of building has been amply rewarded.

AN AMERICAN OPINION ABOUT THE PRESERVATION OF WOOD.

AN old correspondent has kindly forwarded the following extract from the (Chicago) *North-Western Lumberman*, which will probably interest those readers who have followed the recent controversy on this subject in our columns.

"The subject of wood-preserving, so well understood and so long studied in Europe, has received but little attention in this country (America), owing largely to the great amount of timber so readily obtainable at convenient points, and which has seemed to be an inexhaustible supply. The large drain, however, on our forests, and the oft-repeated necessity of replacing timbers, railroad ties, and planks, every few years, on account of decay, has begun to open the eyes of engineers, architects, and practical men of the country; and in this section, especially, there seems to be a growing interest in the subject, and a disposition to give the process a fair trial. Apparatuses and methods for wood-preserving have been introduced and patented in Europe, beginning as far back as 1700. The most valuable were those discovered in 1832 to 1838, but from careful investigation the Hayford process of creosoting, held under patent here, seems to command as high a rank as any now in use. There are certain objections to the favourite systems now employed in Europe, which this process has overcome. The most important, perhaps, is the fact that it is necessary, in the Bethell process, for instance, that the timber to be treated should be dry, while in the Hayford it can be done better right from the saw, and fully as quick, thereby making a saving of large expenses incurred in sticking and drying. To preserve wood from decay is what is aimed at. There are two kinds of decay—dry rot and wet rot. The former occurs in closely confined localities where there is imperfect ventilation; the latter takes place in wood containing sap and exposure to moisture. To prevent this decay the introduction of creosote oil, filling the pores of the wood, prevents it from absorbing destructive elements, and forms a water-proof and air-tight covering to the wood. The apparatus used is simple and strong; the process practical and easy to understand. A large cylinder 100ft. long, 6ft. in diameter, made of $\frac{1}{2}$ in. boiler iron, is the most important part of the works. A railway track runs through this cylinder, upon which the lumber to be treated is placed, and between the tracks lies a coil of steam pipe, 1,400 feet long, which connects with a boiler. A series of perforated pipes are arranged inside the cylinder for the introduction of the oil; a powerful pump is provided, which, by opening one set of valves, becomes a force pump, and opening another a vacuum pump. The process, to be brief, is divided into two steps: First the wood is placed upon cars and run into the cylinder, which is hermetically closed. The steaming process then commences; the temperature rises to 180 deg. Fahr., and subsequently to 250 deg., which is sufficient to evaporate the sap. By the use of the force pump checking of the wood is prevented. When the sap has turned to vapour, and all portions of the wood have become heated to above 212 deg., the steam is turned off and the vacuum pump set to work; this exhausts all the moisture from the wood to its very heart, and brings it to the second step, namely, the introduction of the oil. The pressure with which the oil is driven into the cylinder is equal to about 70 pounds to the square inch. Every stick is bathed in, and absorbs the hot penetrating fluid. The impregnation is rapid, and in a few hours the doors of the cylinder are opened and the lumber withdrawn. The patents held are not for certain oils as prepared, but 'for improved processes for preparing wood to receive the preservative substance required, and apparatuses for injecting such substance into the pores of the wood thoroughly and rapidly.' The works are in this city, and as the process is becoming more known, the amount of lumber treated will be sure to increase. In a paper read before the American Society of Civil Engineers, in New York, last year, E. R. Andrews, proprietor of the works, made some interesting statements. He mentions, particularly, the importance which this preservation of wood should have in the railroad interests of our country. 'Consider for a moment,' he says, 'the consumption of wood in the one item of railroad ties. Massachusetts, using mostly chestnut ties, which last

on an average six years, consumes in this way annually a volume of lumber nearly equal to the whole product of Maine, and the 80,000 miles of track in the whole country, allowing four years as the average life of ties, actually uses up in ties alone 1,600,000,000ft. annually, or equal to one-sixth of the timber product of the whole country. There are also 76,000 miles of telegraph poles, requiring for their renewal annually 43,620,000ft. of wood, or nearly equal to the products of the State of Maine. Telegraph poles were first creosoted in England 27 years ago, and are as sound as at first to-day. The English Government is now creosoting all the telegraph poles in the United Kingdom. With these facts in view, and the certain value which experience has shown to be true, this subject is placed before us. It is certain that creosoted wood cannot decay; 40 years of accumulated experience proves this. The writer has seen ties which were taken from the Great Northern Railway of England, which have been in wear 22 years, and not a sign of decay is visible. They were actually taken from the road bed to be sent here as specimens. No piles of old rotten ties are to be seen in England lying by the track as in this country. When once laid there they stay. If engineers, contractors, and builders would study this subject more thoroughly, we feel confident it would be found to be true in this, as in other things, "that prevention is better than cure." The Mersey Docks and Harbour Board are now advertising for tenders for 43,300 cubic feet of Baltic red wood sleepers 9ft. by 10in. by 5in. They are to be thoroughly impregnated with creosote by injecting, on Bethell's process, 10lb. of the best creosote oil to each cubic foot of timber."

CONVERSAZIONE OF THE INSTITUTION OF CIVIL ENGINEERS.

ON Monday evening last, Mr. J. F. Bateman, F.R.S.S., President of the Institution of Civil Engineers, invited the members of that society, and a large number of scientific gentlemen to a conversazione in the Engineering Galleries of the South Kensington Museum, which had been lent by the Committee of Council on Education for that purpose. The galleries assumed quite a festive appearance, the corridor entrance was carpeted in red, and decorated with striped material of a similar colour, while the well-stocked galleries devoted to models of machinery and naval architecture were lighted by the electric lights of different patentees. Higgins's incandescent lights, the Electric Lighting Company, Wilde's carbon-holders, Werdermann's lamps, the Serrin lamps, Messrs. Siemens Brothers' lights, and Jablochkoff's electric candles, worked by the Société Générale d'Electricité, were all in operation, the lighting power of the several machines being put to a trying test. Besides the permanent collection of models and apparatus, many new objects of engineering interest were specially exhibited in the galleries, lent by various gentlemen and firms, and the chief difficulty experienced by many of the guests was in distinguishing what were the special exhibits from those of the Museum. Models and instruments of great variety and mechanical interest abounded, many of exceeding ingenuity. To give some idea of the scope of the exhibits, we may name among the numerous models Dr. Airy's continuous self-recording mercurial barometer, and instrument for recording duration of sunshine—of more than ordinary value just now; Mr. G. André's electric mining lamp; a few striking models exhibited by Sir W. G. Armstrong and Co.; model and diagrams illustrating the Thilmer scheme for supplying Manchester with water, shown by the president, Mr. J. F. Bateman, comprising the sections and the lengths of aqueduct in tunnel, cut-and-cover-in, and siphon pipes. Mr. H. Bessemer's specimens of crushed steel cylinders doubtless drew attention; so also the Gramme machines and Serrin lamps in the naval gallery, exhibited by the British Electric Light Company, through Mr. A. F. Blandy, C.E.; Messrs. Clark, Standfield and Co.'s hydraulic appliances for the construction of piers and breakwaters; and Mr. James Dea's model of quay walls on concrete cylinders, Queen's Dock, Glasgow, are certainly ingenious and economic, the latter being of cellular section. Of the few models we had time to glance at, we may refer to Hill and Clark's "Means of hanging and working

railway carriage window sashes." Everyone must have experienced vexation sometimes in trying to raise or lower a carriage window, and Messrs. Hill and Clark's improvement consists in simply allowing the sash to work upon a friction band in the door below, the action of a grip fixed to sash, actuated by a small thumb lever, allowing it to remain open at any point. Hopkinson's steam check or isolating valve, for the protection of connected steam boilers, is a useful but very simple contrivance for preventing accidents and loss of steam. Jordan's rock drill, worked by hand power, will be found useful in mining and quarrying operations, and Mr. H. P. Holt's models of iron and timber trusses, suggestive to the constructive architect. Hot-air engines have been well represented. We note particularly Hayward, Tyler and Co's. Tramways and tramcars are made the subject of improvements. We may name, for instance, Edge's grooveless tramway, a working model of which was shown—the feature being a perforated rail, before described in our pages; Hexwood's spring buffer; Barker's, Kincaid's, and Mackison's rails; B. C. Simpson's tramway brake; H. Vignole's permanent way for tramways, &c.; Holt's starting gear, &c. Of course railway appliances, such as couplings, brakes, &c., were very numerous, so were testing machines, and sanitary inventions. In construction there was a very sparse show of models, the only striking exhibits in this class that we saw being Mr. D. Cunningham's floating swing-bridge, Mr. Buck's drawing of cast-iron rib for underground groining, Mr. Sketcheley's model of wrought-iron viaduct, and Mr. S. R. Stephenson's original design for the Conway bridge, and we must not forget some large diagrams of St. Pancras station roof. Electrical lighting apparatus, incandescent lights, and batteries, had, of course, a large share of attention from the visitors, many of the machines being at work, and we noticed particularly Mr. E. A. Cowper's writing telegraph and electrical automatic apparatus for indicating the height of water in reservoirs, exhibited by the General Post Office and H. Rolfe, C.E.

We may add that engineering science was not displayed in the arrangements of the hat and cloak room; the corridor appropriated to that purpose became choked up with guests unable to relieve themselves of their hats and overcoats, and a delay of at least half an hour arose before any of the earlier visitors could get attended to, the attendants being absurdly few. Among the unusually large assemblage, including the president and the leading members of the institution, were several distinguished representatives in science, literature, art, and diplomacy, not a few of the visitors being architects. The electric light threw a charm over the essentially technical and instructive display of practical science, but one missed the floral adornment of similar gatherings of the sister profession and the presence of the ladies.

SUGGESTIONS OF A STATE RECORD OF THE SURPLUS WATERS FLOWING FROM HIGH AND UNCULTIVATED LANDS.*

BY CHARLES SLAOC, C.E.

FURTHER facilities ought to be given to the sanitary authorities of small towns for combining to obtain the best supply of water within their reach and resources. When the sanitary authority of a small town calls for a report on the best means of procuring a supply of water, the engineer called in finds—or may, and, in fact, often does find—that his instructions are too limited to enable him to propound the best scheme in point of quality, quantity, and economy of working. There are, in numerous instances, several small towns lying near together which have no supply of water, and which have separate sanitary authorities. Moreover, there may be, at no great distance from these small towns, a larger town which requires a further supply of water, or there may be—and, in fact, in one instance at least there are—two such towns.

To confine my remarks to cases within my own knowledge, there are three separate local authorities in a district comprised within a limit of five miles and a breadth of two and a half miles, the aggregate population of which is 25,000. In this district there is no supply of water. At a distance off there are two towns of a population

* Contributed to the recent National Water Supply and Sewage Conference of the Society of Arts.

of 40,000, taken together, and in each town the supply of water is very inadequate, the one in point of quality, and the other of quantity.

Taking first the three smaller towns, each has its sanitary authority, and each has called for a report on the water question, there having been made three reports by different engineers. The instructions to each being limited to the requirements of the one place, the engineer finds it impossible to do more than recommend the best of the sources in the immediate neighbourhood, whereas if any one of the engineers had been consulted jointly by the three Boards, he would probably have recommended a better plan in respect of the three requirements of quality, quantity, and economy of working.

If we now take into consideration the two larger towns also, both of which are seeking means of improving the water supply, but neither of which can do so from the present sources, there appears a further reason for a combination of towns for this purpose.

There is a range of hills, the surplus waters of which would afford an ample supply to all the towns by gravitation. The distance is certainly considerable, but it would probably be found not too great for economy in a combined scheme. But when each authority considers its own scheme singly, it seems preposterous to go to such a distance, and, each authority acting without reference to the others, no one investigates the capabilities of the larger and better source.

What, then, ought to be done in all such cases? It should be, if this Conference thinks well to recommend it, that the utmost capabilities of all such sources to afford a supply of water to towns be investigated and declared. Then each separate sanitary authority would know how much water is within its command, and if, knowing these capabilities, the engineer should advise that it would be economical to make joint works, each authority would add to its share of the cost of the joint works that of its own service reservoir, branch main, and town piping.

An analogous precedent for such a record is the census of the population. When we want to know the population of a place, we do not, individually, count or estimate the number, but turn to the State record. So should it be with water. The capabilities of every area of high ground to afford water for towns should be recorded, both as to quantity and elevation, and all proper sites for storage reservoirs should be investigated, and measured as to their possible contents.

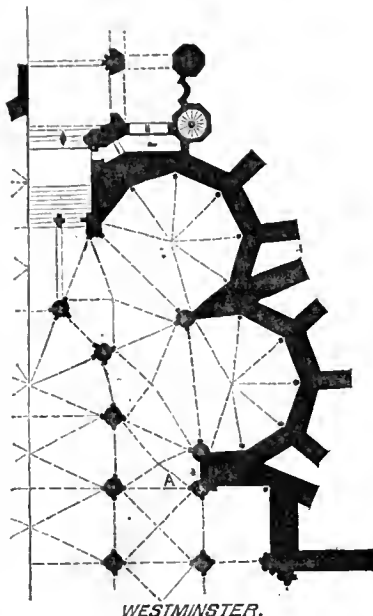
Some of these areas of high ground are already appropriated to existing supplies of water, but many remain unappropriated, either wholly or in part.

THIRTEENTH CENTURY ARCHITECTURE.*

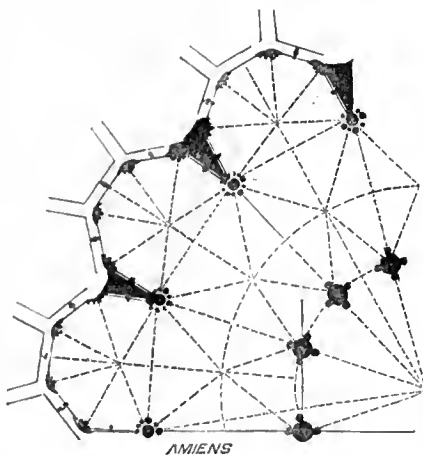
(Continued from p. 582.)

I MIGHT spend the whole evening in explaining to you the various developments of plan which the necessities of the apse and its chevets gave rise to. There is no feature in which so much varied ingenuity has been displayed by the mediæval architect, and to the French (of the Isle de France especially) the palm must be awarded in this matter. None others were so capricious or so bold. The Italians and the Germans never attempted to compete with them, though they constantly made use of the apse, and our own ancestors, as I have said, were led to give it up in favour of the square end, which, though it may be as noble in its effect, is neither so ingenious, nor so difficult in its construction. The whole character of the design of Westminster Abbey is English, not French, and the planning of the apse is unlike that of any French apse, and is distinctly original. In my opinion, it is the work of an architect who, seeing the results achieved by the French architects, desired to achieve the same ends without exactly concerning himself as to the means which they employed; and hence, his work is not only in its detail, but equally in its ground plan, distinctly an English work. The usual difficulty in planning an apse is to get the sides nearly equal, the bays of the aisle regular, and the chapels beyond equal also, and to do all this without waste of space or unnecessary amounts of walling. It may almost be said that no two French chevets were alike, so many were the efforts to produce a

perfect result. In Beauvais, Bourges, Notre Dame Paris, Rouen Cathedral, and Le Mans, you will find the most perfect arrangements—surpassed, however, I am disposed to think, in the work of the French architect of Toledo. You will do well to consult on this point the article "Apside" and "Architecture," in M. Viollet le Duc's "Dictionnaire Raisonné," whose engraved ground plans will explain the ease to you in a way in which no words can. At Westminster Abbey, as I will try to show you on this black-

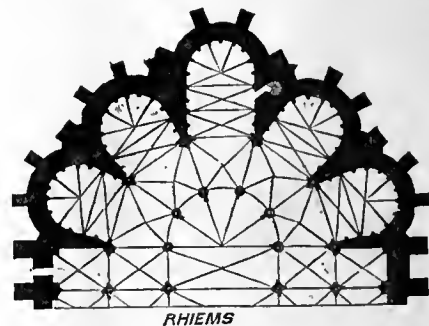


board, the architect has contrived to make all his chapels exactly equal: but in order to do this he has had to make a rather clumsy mass of masonry at A, between the end of the outer aisle and the first chapel, and he has an awkward bay between the choir aisle and that of the apse, cutting into the perspective. In almost all the French plans the base line of the apse is definitely marked, and the lines, as far as possible, all radiate from the centre of the central apse. At Amiens Cathedral, which is the most perfect, they all do so, as you will see.



The surrounding chapels are all equal, and there is no awkwardness in the junction of the flying buttresses of the apse with the walls and buttresses of the side aisles. In the rough drawing of the eastern end of St. Remi, at Rheims, you will observe a series of 5 circular chapels opening into the processional aisle. At Westminster the line of the commencement of the chevet is not marked; one of the centres of the apse has no chapel opposite, and there is a great awkwardness in the prolongation of the radiating treatment of the buttresses beyond the base of the apse. In this respect no French example is like it. I dwell upon this point so much, in order that I may give you some idea of the nice questions which arise and have to be dealt with in

such constructions, and with the hope that even a slight study of them may increase the interest which you find yourselves able to take in old buildings. Whilst, however, the architect of Westminster was thus, in his own way, solving this difficult problem, St. Mary Overie and the choir of the Temple Church were being built on plans which are more representative of ordinary English work. The Round Church at the Temple does, indeed, stand second to none in its mode of meeting some of the difficulties of vaulting circular buildings. But the choir is an admirable example of delicate English work, and may well be studied, together with the church of St. Mary Overie, or St. Saviour's, Southwark, which is even more interesting. It is a capital example of the skill shown by 13th century architects, who have made a small building look large by the subdivision of the parts in detail. The bays of the choir are only about 12ft. wide, and yet the triforium is an arcade of four divisions. The main columns also may be noticed as extremely good in their design, alternately circular and octagonal, with delicate shafts on the four sides. The eastern chapel, four bays in width by three in length, is still very charming, and though it has been a good deal damaged by repairs, some of the mouldings—e.g., those of the capitals and of the groining ribs—deserve study. You may well notice here also some points in the groining. If you look carefully at it you will see a great difference between the groining of the aisles and Lady Chapel, and that of the choir. In the former, the diagonal rib is a semicircle—in the latter it is a pointed arch. The former by much more agreeable, for the eye is carried forward from one rib to the next, without a violent pause, and thus is in every way better in effect. Uffingham, in



Berkshire, is one of our best 13th Century churches, and this had an octagonal central tower, and a chancel with its eastern bay alone groined. Hythe, in Kent, is far finer; here the clustered shafts, the elevation of the chancel above the nave, and the contrast between the simplicity of the nave and the magnificence of the chancel, and the beauty of all the detail make it one of our most perfect examples of a parish church on a small scale. Here the whole eastern part was groined. Stone Church, near Dartford (which you ought to visit), is specially interesting, because there can hardly be a shadow of doubt that it was built by the same architect as Westminster; but it has a square east end, and it was my happiness some years ago to restore the vaulted roof of the chancel, which had two bays of plain quadripartite vaulting, and a square east end. Here, as at Hythe, the whole of the details are most delicate. I shall not detain you longer on questions of ground-plans, but I repeat, that you ought, when you visit an old building, first of all, to notice its peculiarities in this respect. You will find certain arrangements of the plan contrived to serve certain recognised wants, and the way in which these have been modified as fresh wants arose, so as to meet the requirements of special rites, is among the most interesting subjects of inquiry to the ecclesiologist. Each nation had its own special development in consequence. In Germany and France and Spain, almost all buildings had stone vaults, and the architect had, therefore, to take his heavy roof into account from the commencement. In England, on the contrary, stone roofs were uncommon, save in our grander churches, and the architects were, consequently, much less bound to make their plans regular and symmetrical, and an amount of variety was a consequence of this, for which we may well be grateful.

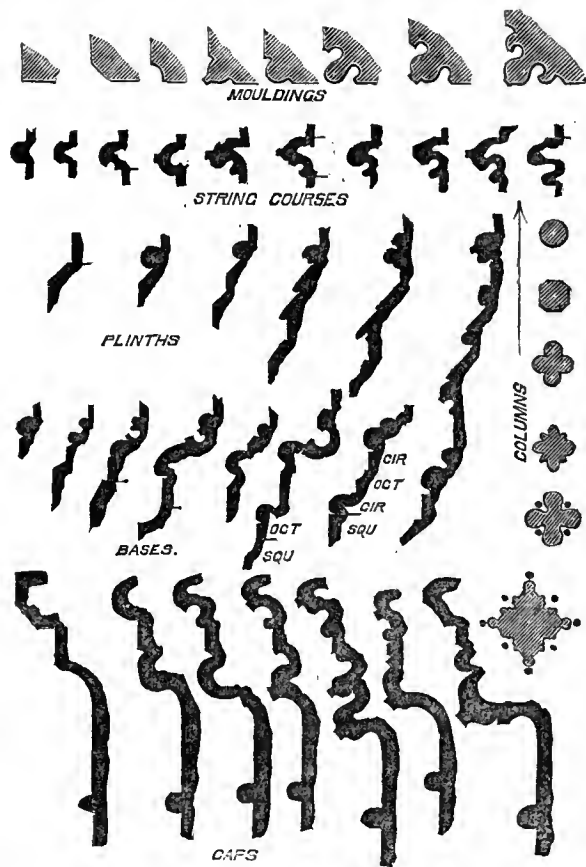
* A Paper read by GEORGE EDWARD STREET, R.A., before the members of St. Paul's Ecclesiological Society, May 21st, 1879.

The next point to be observed is the general character of the design. Now this depended in the 13th century, just as much as it does now, on the taste and skill of the master mason or architect, and you will find all the difference in the world between the work of one man and of another. They were affected also by the material available. If you find yourselves in Sussex, visit such a church as Clymington, and you will see how the architect contrived, with very humble materials, and very small amount of enrichment, to produce a work of art almost as interesting as the sumptuous works which at the same time were being built in the far richer districts of Northamptonshire and Lincolnshire. His work had few mouldings, and seldom went beyond the use of a delicate chamfer for all angles. This use of the chamfer is one of the features of the period, and it is singular how much may be done with it. In this work the windows are simple lancets with deep splay; the glass is set close to the outside face of the wall, the buttresses are simply weathered, the roofs are of timber arched in a simple fashion, and the towers so simple in design that you might almost suppose no architectural skill was required, for they are finished with simple pieces of oak covered with shingle. Yet they are not inferior in artistic character, or in the proper use of material, to the Northamptonshire stone churches, where the architects having good stone close at hand, and the example of their cathedral architects to guide them, built churches full of precious and beautiful detail, designed a number of varied towers and finished them with stone spires, which are to the present day the proper subject of admiration to all of us. But to understand how to observe these very varying beauties, you must know how to observe and distinguish the features of detail which give them in an architect's eyes so much of their value.

And first, as to mouldings. You know the office which they fulfil doubtless, but without study you cannot understand how subtle their beauties are, and how much the effect of the finest works depends upon their being well designed, or the contrary. The chamfer was the great improvement introduced by the 13th-century architects. It was formed by cutting away the angle thus (Mr. Street proceeded to trace on the blackboard the progress of the changes that could be effected on a stone by cutting mouldings upon it, as shown on accompanying illustration); the next step was to hollow the flat surface so as to afford a play of light and shade upon it; or the angle might be left, and the parts of the stone above and below each cut into by a roll, or into two half-rolls; then the hollow was deepened, and a small fillet added beneath it, and these rolls and fillets were multiplied so as to vary the effect of the shadows and lights. The string-courses, plinths, and bases were similarly the subjects of similar changes, all made with the object of getting more variety of light and shade, and so as to enrich and emphasise the architectural lines. Nowadays mouldings are too often drawn without the slightest sense of their fitness for the place, but these 13th-century English mouldings were, I think, the very best in Europe; they were well-drawn, fitted to their places, and infinitely varied in section. They were adorned with dog-tooth and other carving. They cannot be understood without reference to a point in which there is as much difference between English and foreign work as there is in their plans. This is the shape of the abacus of the capital. Amongst the French the use of a square abacus led to a square section of mouldings, and to great uniformity in their design, but they secured one fine effect of shadow—breadth and boldness. In England by the end of the 12th century the square cap was discarded in favour of a circular one, and with results not foreseen. It was impossible to plan mouldings with a broad plain soffit. It became necessary instead to plan them on the chamfer plane, as mouldings fitted to squares would overhang the caps. So it was necessary to devise fresh forms. Then there was a loss of light and shade so simply obtained by the old fashion, and this was regained very skillfully by deep-cut hollows at the junctions of stones, and among the mouldings. To our circular cap we owe our beautiful system of mouldings. This necessity for the study of effect by means of moulding led to the use of mouldings to an extent undreamt of by other schools. Our English capitals, instead of being always carved with foliage,

were more often moulded. With moulding the architect knows exactly the effect he will produce; with sculpture, unless he models all his work himself, he is at the mercy of some one else for a most important feature. Wherever you go, let me beg you, therefore, to make a point of examining mouldings with the greatest care. Whenever you have come to understand them, you will find your power of distinguishing between good and bad works, whether old or new, wonderfully increased, and the pleasure you can take in good work increased in proportion. One note I must make here, which is, that the rounded and soft lines of 13th century mouldings accord singularly well with the round and true lines of traceries, with the circular shafts which were so much esteemed, and, indeed, with all the features of the buildings they adorned. So much is this the case that when at the end of the century the window traceries became more complicated, and the columns ceased to be shafts or clusters of shafts, the mouldings were all altered to harmonise with them, and in the 15th century the hard, sharp lines of mouldings tallied exactly with the formal and precise designs of the traceries. The columns of the 13th century were circular, octagonal, clustered, grouped in fours with smaller shafts at the angles, or even with double series of the attached shafts, to give great richness of effect. Their variety was endless. Indoors they retain the general arrangement of the 12th century, a series of columns in square recesses, one with angles taken off or moulded. For detached purposes they are of the various sections sketched (see below), and in this age it

of five and even of seven—then contained under an arch, then adorned with cusped or plain piercings in the wall above, then combined with circles; cusplings grew before the end of the century into most elaborate traceries, but very early in the century, as at Netley Abbey, had produced distinct tracery, and by the middle of it in the Chapter Houses at Westminster and Salisbury, we see traceries of the most complete and finished description. The Westminster Chapter House windows were finished in A.D. 1253. Essentials of good tracery are subordination of members, and divisions into primary, secondary, and tertiary orders of tracery. These are carefully observed in work of the 13th century. At that time the design of openings was as important as the lines between them, so that whether you regard the lines of stonework or the voids, the eye is equally gratified. Differences between early and late traceries are all in favour of the former. The arrangement of cusps is well worthy of attention. Ogee lines are never used, the cusps are inserted in a groove, and the cusping of arcades is undercut, as at Westminster. Very frequently its outlines follow no stiff mathematical lines, but show by their variety and freedom that they are drawn by hand, as at Lincoln. In the earliest cusping all the mouldings follow the cusps; the later cusps are subordinate to an inclosing line. When you visit Westminster Abbey, ask permission to go up into the triforium, where you will be able to judge of the rich effect of the double traceries, partly moulded, partly carved, and very plain on side next roofs, but still good. The arcades at Westminster and Stone are, by



became the fashion to form these columns of marble. This could not be got in long blocks; hence came banded shafts. The extent to which this charming custom was carried may be seen at Westminster, at Salisbury, and the Temple Church. It had its inconveniences, however, in construction, as these collections of columns depended on their caps, bands, and bases for holding them together, and, therefore, for their strength; and it was found, before the end of the century, that safer building could be done with stones built in courses, and so gradually marble shafts went out of fashion. But they are one of the special and most beautiful features of the 13th century.

In the windows, doorways, and arcades of this century we may again trace primarily the same sort of development from the rude original. The lancet was doubled, trebled, arranged in groups

the way, identical, but have been horribly defaced at Westminster. The heads of windows of this period were moulded, carried on shafts, and generally struck from a centre lower and different from the exterior arch. The doorways of the 13th century are among the best features. The large doors are often double, as at Lincoln and Ely, and are generally under an inclosing arch. The jambs are a series of shafts, engaged or detached, and in the latter case have bands. In small doors the heads are trefoil or segmented. One of the features which most strike us in these is the hammered iron-work of the hinges. This was very varied in pattern, delicately beaten out, a work of love to the workman, and so well and artistically executed that it is difficult to get anybody to do anything like it in spirit now. English doors, however, are not so fine as French; those, for

instance, in the west front of Salisbury Cathedral are mere holes in the wall, and as a rule our doorways are low and small. The porches, however, are very fine, as at Wells and Salisbury, groined with arched at the sides, sometimes with fine outside arches, and generally in such cases of two stages in height. The carpentry of this period was certainly not so good as the masonry, and this was very clearly the case in the roofs. These are of oak, and the rafters are pinned together with king-posts. These often resemble 15th century work; but look carefully at the sections of the tiebeams and the king-posts, at their mouldings and outline, before assigning a date. Arelid timbers were used, but not so commonly. In the steeples the custom of the district affects the design very much. There is a great change herein from the work of the 12th century. Instead of being large and clumsy, they were, as a rule, lofty in their proportions, and surmounted by spires. Many examples are either octagonal or partly so. Stone spires of this date as a rule have no parapets. They just overhang the walls of the tower, which finish with an eaves cornice under them. These eaves cornices are a feature of the style. The tower buttresses usually finish below the belfry, and this is richly areaded with columns to its windows, and at the angles. The spires have spiral lights, but always on the cardinal sides, and not on the angle sides. So, also, buttresses are always square, and never diagonal, as in the Perpendicular period. The spiral lights have shafts for monials. Pinnacles are not so common as afterwards, but they do occur, generally rising out of the branches of the broach spire. You will often find that the 13th century belfry stage was not considered fine enough or lofty enough, and has been surmounted by another at a later period, as you may see at Oakham and Grantham. I think we owe our best spires to Normandy, where, at a very early date, very fine examples were erected, as at Caen. Some admirable examples remain, as at West Walton, in Norfolk, which are covered with arched, have octagonal angle pinnacles, from the ground up, finishing at the top in a timber spire, covered with lead. The spire is gone here, but at Sutton St. Mary, on a nearly similar steeple, it remains. Both are detached towers. You may see a good copy of that at West Walton at a church in the City-road, designed by Sir Gilbert Scott.

Sculpture is of two kinds—1, foliage; 2, figures. That of foliage shows a great development on what had gone before. The best Transitional caps were copied from Corinthian, and in French work natural foliage was to some extent grafted on this. Early English foliage is marked by its extreme gracefulness. The same sense of beauty which made the architect's design so graceful naturally produced this result. The idea was, as a rule, not to copy natural foliage, but to give a conventionalised representation of the essential facts of nature. The variety is great, but the commonest form gives us either capitals with distinct but regularly-arranged masses of foliage, each of these being a branch of foliage, growing firmly and very gracefully from the neck of the shaft. Or another variety gives caps with a continuous mass of foliage. In addition to this necessary carving on old lines other occasions for its use were devised. One of the most characteristic is the custom of diapering the plain surface of a wall, as at Westminster Abbey. The delicacy of these diapers is extreme; see, for instance, some in the Chapter House at Westminster. Another use is the carved decoration of mouldings; sometimes with foliage, oftener with the dog-tooth. This was for giving emphasis to a moulding, and was a development from the nail-head, which was also still used. Foliage was also used for stopping mouldings under caps, for covering a transition from circular to square of the base, and for the ends of cusps. Towards the latter half of this century the custom of copying natural foliage was much adopted, as at Southwell Minster. This was beautifully executed, and under certain conditions may be allowed; but it is inferior in excellence and in skillfulness to conventionalised work. The leafage is always very luxuriant, growing in very strong curves with extremely good light and shade, and often undercut in the most elaborate manner. The leaves generally exhibit some variety of trefoil; no architectural foliage is so good as this usually was. You ought to carefully notice the spandrels of the arcades at Westminster and

Stone, and the leafage round the arch mouldings. Sculpture of the higher sort, of figures and subjects, was not so common in England as in France. The west front of Wells is the finest example we possess. But you may look at Westminster at the angle in the spandrels of the transepts, and at the bronze figures of Henry III. and Queen Eleanor on their monuments. These are thoroughly fine works of art; they were executed by Torel—an Englishman—and in a style which makes one proud of him even if his work be compared with the best of the contemporary Italian artists, such as the Pisani. The best sculpture is generally that of recumbent effigies on monuments. At Ilgham Ferrars you will see panels of sculpture in the fine west doorway, and the South Kensington Museum and the Architectural Museum afford you more opportunity of studying this art than most of our old buildings, so complete has been the destruction of figure sculpture in our churches, thanks to Puritanical fanaticism. Draperies always hung in straight and simple folds; the figures are always draped, generally picturesquely posed, and subjects very simple in their story, and not at all complicated in their treatment.

The decorative work of this age is to be studied as well in this city as anywhere. Not to speak of what you may see in museums, consider what you have at Westminster. To begin with, there are the pavements of Edward the Confessor's Chapel and before the altar. They are of opus Alexandrinum; the latter was given to the church by Abbot Ware, and finished in 1268. It is similar in style to the pavements in many Italian churches, and an admirable example. You should examine this altar pavement carefully, and note the difference between it and that in the Confessor Chapel, which is probably an English imitation. Of the same period are the encaustic tiles in the Chapter House—some of the best in England in execution, though not the most fitting in design. They represent traceried windows, intersecting squares and circles, and very elaborate foliage. Then, again, there is the shrine of the Confessor, another work, like the pavement, of Italian origin; the wooden sedilia and the Coronation chair, the enamelled figure of William de Valance, the painted altar frontal or retablaux, the ironwork in front of Queen Eleanor's tomb, are all of them works of the 13th century, by a careful examination of which you may arrive at some sort of an idea of how a church well furnished throughout at that period looked.

Now as to stained glass. In the 12th century glass was almost always of one description—a mosaic of rich colour. In the 13th century, though to some extent the mode of design was similar, the details were more elegant, and the use of white glass was developed. The principles on which it was designed were simple and true. Pot metal was used for colour, stain being seldom used until the end of the century. You should notice the drawing and the arrangement of subjects in panels with grisaille between. Leading followed leading lines, and the ironwork followed the general scheme, and added much to its effect. The only shading was a thin smear, which being removed left transparent glass for the high lights. The drawing of details of stained-glass was extremely bold and careful; generally it was strongly outlined, and leaves were filled in with delicate lines instead of shading. This is entirely correct in principle, and although I have not a word to say against later glass, I always feel on looking at that of the 13th century that none surpasses it in brilliancy and force of colouring. The design was also never a mere imitation of stonework, but always a genuine design made for glass and suitable for nothing else. The introduction of grisaille was one of the beauties of this style. Note also how the ironwork of the windows was designed to harmonise with the glass; and in some cases it was almost as beautiful.

It is time to conclude. I have tried to show you that the art of which I have been speaking was not only true, and good, and consistent in all its branches, as all living and real art must be, but that it had transcendent merits which can only be thoroughly appreciated by those who have really made a study of them. To me a beautifully drawn moulding is a source of the greatest pleasure, and I never see a moulding which produces such good effects as do those of the 13th century. The hands which fashioned them were indeed those of cunning artists,

trained in the best way. Yet they did not despise formal systems of perfection, for at this time more than ever buildings were undoubtedly often planned on some geometrical system of proportion, of which the equilateral triangle was usually the foundation. This was certainly the case in the noble Abbey of Westminster, of which I have had so often to speak to you. I have not been able to tell you a tithe of what I should have liked to say. I ought to have been able to tell you not only of Westminster, but of countless other churches, large and small, throughout the land, all worthy of study. I could have told how they may be classified into groups, speaking to us of the skill and genius of individual architects, each in his own district or diocese; or I might have dwelt on the vast development of monastic architecture in this century, and how in some districts—as Yorkshire—the ruined abbey afford evidence of the existence among us of architects second to none in Europe of any age. I might, too, have told you that this art was not confined to the church, but that everywhere and for all purposes, it was one and the same in spirit and in intention. Indeed in those days art was the natural expression of men's delight in their work; and we need not be surprised if we find it marked more than that of almost any other period by all the characteristics of the best art—simplicity, grace, tenderness, sobriety, purity and force, are the virtues it possessed! Few, save those who have given their lives and all their enthusiasm to the study, know how completely all these terms are justified, or understand how each inspection of a work of this great age, each study of it in detail, increases one's respect and veneration for it. We know next to nothing of the men who wrought these marvels. They worked for God and their church, in the best way and with little thought of themselves. We have the greatest difficulty in imagining to ourselves how the result was attained. Every workman seemed to have been an artist, and to have known how he ought to work. Yet there were no museums, no schools of art, no lecturers on art. They had undoubtedly a public who understood and encouraged their work, and here they had an untold advantage over us at the present day. We have a public which is swayed in every direction by every breath of popularity and fashion, a public which admires good work and bad work with equal zeal, and which seldom troubles itself to know whether it has any reason for admiring, or indeed whether it is possible that there can be creeds of right and wrong in art, which make some things admirable, and others fit only for condemnation. It is because such a society as yours may lead some men to study in an intelligent way these noble works of the highest period of English art that I have responded readily to the request that has been made to me to speak to you this evening; and though I cannot hope to have given you much information on a subject which is far too large for such a lecture, I trust I may feel that I have persuaded some among you that there is enough merit in the remaining works of the 13th century English architects to make it worth your while to devote yourselves to some further study of them in detail beyond what you have ever yet devoted to them. If this be so, I shall not have lectured entirely in vain.

PICTURES BY M. GUSTAVE DORÉ.

TWO additional pictures of colossal dimensions, by M. Gustave Doré, have just been added to the Doré Gallery in New Bond-street, and through the courtesy of Messrs. Fairless and Belforth, the proprietors, we have taken the opportunity of a private view to inspect these latest works of that artist. One is a picture of the "Ascension," and after M. Doré's "Triumph of Christianity," we consider it to be among his finest compositions. The "Ascension" has been a theme upon which the greatest painters of all ages have delighted to exercise their power of imagination, and so far, indeed, the materials and conceptions of the Italian masters have been ready to his hand; but notwithstanding this qualification and whatever technical faults we may find in M. Doré's painting, it will be acknowledged that he can invest the figure of Our Saviour with ideal grandeur and dignity worthy of the subject and the scale adopted. In the painting before us the central figure of the Saviour realises the attributes we look for. He is shown ascending through the cloud, robed in light blue

drapery, with extended arms, the lower portion of the picture being filled with a crowd of ministering angels, while above the Saviour's head a glory of angels rise in perspective gradation. Through a drifting cloud in the background are seen the small and distant group of his apostles looking steadfastly towards their Lord. The life-size figures that crowd the canvas, and the whole composition is symbolic in treatment, well balanced, and impressive in outline and accessories. The left-hand angel is perhaps chargeable with being rather stiff in drawing. In the colouring the artist has chosen light and harmonious shades; the effulgence of the "glory" above the head of the Saviour seems to irradiate the group below, and there is an opaline hue in the tints and blue of the drapery that throws a splendour over the whole picture. In the "Ecce Homo," M. Doré has shown Christ crowned with thorns, clad in the scarlet robe, descending a flight of steps. On each side of him are Pilate's soldiers, while below is a surging mob of Jewish rabble, in various attitudes, mocking and gesticulating. The composition is simple and symmetric; the hall of judgment forms the background of the Saviour's figure, which seems to stand out in marvellous perspective. The groups of figures are painted with the same dramatic power and action that strike us in most of this artist's work, and the picture must be pronounced a success. Unlike the "Ascension," the colours selected are deeper, and the handling more solid and massive, befitting the subject chosen. Those who admire grand, imaginative compositions of this class will find in M. Doré's two recent additions to the gallery further evidence of this master's power of conception and boldness of execution, that places his works almost beside the masterpieces of Correggio and Michael Angelo.

LIVERPOOL ENGINEERING SOCIETY.

THIS Society held its usual monthly meeting on Wednesday week at the Royal Institution, Colquitt-street, Mr. Morgan E. Yeatman, M.A., in the chair.

A report was read by Mr. Coard S. Pane, Assoc. Inst. C.E., on the means of communication between Liverpool and the Cheshire side of the Mersey, past, present, and proposed. The paper was illustrated with plans, diagrams, and views of Liverpool at the various dates referred to in the paper. The author commenced by giving a sketch of the early history of Liverpool in connection with the ferries, and remarked that with one exception he had been unable to ascertain the date of the establishment of the older ferries, and he concluded therefore that originally they had only been simply convenient points of access, to which persons were ferried who had business at the various places on the opposite side of the river, and as time advanced steps were constructed, and the regular ferries grew into existence. A drawing of Liverpool in 1728 was exhibited, showing the landing-stage near the present Custom House, and old ferry-boats, called "grabs," which used to ply before steam was used. Particulars were given of the cost of the various new piers and stages which in latter years have been erected; a description of the old *Elva*, the first steam ferry-boat run on the Mersey, was given. The various alterations in the fares were given, from the time when the monks charged a farthing to the present time when a penny is charged. The author entered fully into the various improvements in the mode of embarking and disembarking on the Liverpool and Cheshire sides, commencing from the period when passengers walked out to the "grabs" on planks and tressels to the present date, when they pass comfortably on to the boat by means of the magnificent landing-stage and Mr. Harkness's ingenious gangway. Attention was then drawn to the various schemes which have been proposed for crossing the river by bridges or tunnels, and sections of the river at the various points of crossing were exhibited. In concluding, the author hoped that the energy which had enabled the promoters to carry out the railway between Liverpool and Manchester in 1829 had not died out from amongst us, and that some means of connecting parts of Liverpool and Birkenhead would be effected.

An interesting discussion then took place, followed by a vote of thanks to the author.

Mr. Westley has been appointed surveyor to the Local Board of Leyland, near Preston.

COMPETITIONS.

BIRMINGHAM.—We understand that more than fifty designs have been sent in in competition for the new Wesleyan college about to be built at Birmingham, at a cost of about £25,000. Mr. Alfred Waterhouse, A.R.A., is to be the professional referee.

RAMSGATE PROPOSED NEW ROAD COMPETITION.—At the meeting of the Commissioners on Tuesday week a strong effort was made, after a surreptitious canvass of the town, to push forward the claims of the design "Viator No. 2" and two other designs, which are practically out of the running. The first-named design is said to be by Mr. Pite, a member of the Board. The attempt alluded to was, however, a total failure; the recommendation of the sub-committee was rejected, and it was resolved that the following eight designs should be reserved for further consideration, viz.:—"Front," "Che Sara Sara," "Economist," "Westminster," "Advance," "Percy Britton," "Viator No. 2," and "Audsoter et Sincere." Mr. Abernethy was requested to favour the committee with his notes upon these designs made during his inspection. It would thus seem that the premiated designs are altogether ignored—a somewhat remarkable circumstance. Some of the inhabitants of Ramsgate openly state that the whole scheme will fall through. It is to be hoped this will not be the case. The Commissioners have, at least, two good designs before them, and if they could be induced to call in an independent and competent professional adviser, and disregard the opposition of the tradesmen of Harbour-street, who are strong on the Board, and are mistakenly opposed to any design which does not cross Harbour-street on the level, a satisfactory result might soon be arrived at.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The eleventh meeting of the Session was held last Wednesday; Mr. Syer Cuming, F.S.A. (Scot.) in the chair. Some charming paintings copied from the roof screen of Westall Church, Suffolk, were exhibited by Mr. Watling. This screen has a remarkable series of figures of apostles and saints, each with his proper emblem, and of 15th Century work. Mr. Cecil Brent, F.S.A., exhibited a small cylinder of Assyrian date, the inscription upon which was rendered by Mr. de Grey Birch, F.R.S.L. Mr. Morgan, F.S.A., described a Spanish figure of the Virgin Mary, which is said by tradition to have been carried by the Christians before their armies during the Moorish wars. It is about 18in. in height, and is admirably carved. Mr. Loftus Brock, F.S.A., described a series of fragments of Samian ware recently found in excavations near the Bank. They are for the most part ornamented, and are remarkable for showing traces of some great fire in remote times, many being burned black, a peculiarity which has frequently been met with in other parts of London. The first paper was by Mr. W. G. Fretton, F.S.A., on the antiquarian losses in Coventry during the last 150 years. The history and position of all the ancient buildings of the City which have been demolished during that period were passed in review, and the circumstances of their removal were dwelt upon. Their demolition was occasioned for the most part by the indifference of their custodians, who appear to have had no interest in them as examples of art. A similar record might be made of almost every other ancient town in the country. The loss of the beautiful market-cross, and of the town gates, was especially dwelt upon. The restoration of the churches has resulted in several ancient features being brought to light, but much unnecessary "newness" has been given to these buildings. In the discussion which followed, the principle of removing the work of the last 200 years, in so-called restoration, was condemned by several speakers. These were evidences of the history of the buildings, as well as the features of older date, and should be retained. The second paper was by Mr. Pinches, who described the remarkable bronze gates recently brought to light by Mr. Rassau, at Belewart, nine miles from Nîmroud. The circumstances of the discovery, the position, and the whole series of the figures on the bronze plates, were passed in review in an exhaustive manner, and were illustrated by several admirable

photographs. The so-called Greek figures were referred to, and the peculiarities of the armour pointed out.

PARLIAMENTARY NOTES.

METROPOLITAN FIRES.—Last week, in the House of Lords, Lord Granville, in a comprehensive speech, brought under notice the provisions made in the metropolis for the extinguishing of fires. With the view of placing the case clearly before the House he directed particular attention to the report of the Select Committee of the House of Commons which sat in 1877. He gave the highest praise to the Fire Brigade; but pointed out that they were too few in number. The circumstances on which, however, he particularly relied was the want of unity in the forces which ought to be brought to bear in case of fire. The police were not in any way combined with the brigade, and though as a rule the breaking-out of a fire was discovered by a policeman, his exertions in the matter were confined to giving the alarm. Then when the brigade arrived it was powerless till the turncock appeared upon the scene; and the turncocks of London were in the employment of eight water companies. The noble lord strongly advocated a unity of action between the police, the brigade, and those who had the control of the waterpipes. To bring this about he regarded an amalgamation of the eight water companies under one single central authority as indispensable. He concluded by moving for papers. Lord Beauchamp, in explaining that the Government did not see their way to taking action in the matter, though they admitted it to be one of great importance, said the nearer they approached the subject the more evident became the difficulty of dealing with it. Lord Aberdare regarded the reply of the Government as a disappointing one. The subject brought under the notice of the House by Lord Granville called for speedy legislation. Lord Denman said that legislation on the subject in the present Session was impossible, but every house ought to be provided with a steam apparatus for extinguishing fire. It could be procured at a trifling expense. Lord Shaftesbury observed that 30 years ago he was chairman of a Board of Health which proposed a scheme for a proper supply of water to the metropolis. The result was that all the water companies rose in arms and an end was put to the Board. The supply of water was so shameful in some parts of London that if a conflagration broke out in one of them another "Fire of London" might be looked for. The health, safety, morality, and happiness of the people of the metropolis demanded immediate action in this matter. Lord Fortescue also urged the necessity of immediate action. The Duke of Richmond and Gordon thought that some of the noble lords who had spoken on this subject were unreasonable. They did not appreciate the difficulty of the question. He knew it had engaged the attention of the Home Secretary, and that his right hon. friend would be the first to introduce a measure for dealing with it if he could only see his way to doing so. Lord Camperdown told the Government that they had that evening given but cool comfort to the inhabitants of the metropolis. The motion for the papers was then agreed to.

CHIPS.

A petition has been filed in the Bradford bankruptcy court, on behalf of James Lumley, civil engineer, of Kirkgate, Bradford, and engineer to the Altofts local board. The liabilities are estimated at £36,000. Mr. Lumley has been compelled to adopt this course, it is stated, in consequence of the heavy demands made upon him by building clubs with which he is connected.

Mr. Cross took part on Saturday in the opening of the second block of artisans' dwellings at Stroud-Vale, Islington, and subsequently laid the foundation-stone of a third block, to be erected with a like object, by the Victoria Dwellings Association. Mr. Charles Barry is the architect.

A new infirmary is about to be erected by the guardians of the Croydon Union for 600 beds. The Pavilion principle is to be adopted. The site covers an area of about eight acres. Plans are being prepared by Messrs. Berney and Monday, architects, Croydon.

Improvements are being carried out at the Congregational chapel, Burnham, Essex, including the erection of a spacious gallery. The work is being done by Mr. Charles Read, of Burnham.

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ILLUSTRATIONS.

CHURCH OF ST. MARY, SPEENHAMLAND.—NEW TOWN HALL, LOFTUS-IN-CLEVELAND.—DETAILS FROM ST. GEORGE'S CATHEDRAL, SOUTHWARK.—PREMIATED DESIGN FOR COTTAGE VILLA.—EXAMPLES OF WROUGHT IRON WORK.

OUR LITHOGRAPHIC ILLUSTRATIONS.

ST. MARY'S CHURCH, SPEENHAMLAND.

ST. MARY'S Church at Speenhamland, Newbury, was built about forty years ago in poor style. The entrance front has been taken down and a new chancel, chancel aisle, organ-chamber, and vestry erected in its place, and new columns and arches are intended to be erected in the nave with roofs throughout. Mr. G. E. Street, R.A., is the architect under whose direction the alterations and additions are being made.

TOWN HALL, LOFTUS-IN-CLEVELAND.

THE Earl of Zetland has acted the part of a liberal proprietor towards this small town. For many years the magistrates had experienced great difficulty in conducting public business, owing to the absence of any room or hall suitable for the purpose. With the advice of his general agent, Mr. George Dale Trotter, his lordship accordingly resolved, not only to meet the want in question, but to erect such a building as should be generally serviceable for the inhabitants. The result is, the new town hall, erected in a freely treated style of Late Gothic, from the designs of Mr. E. R. Robson, of Parliament-street, London. On the ground floor the building comprises police-court, local board room, clerks' office and retiring-room. On the first floor there is a public room, news-room, office and ante-room. The site, which adjoins the parish church and has a frontage to the main street of Loftus, as well as the building stone from the local quarry, have been presented by Lord Zetland. In addition thereto, he has defrayed the entire cost of the building, which, with other expenses, will amount to about £4,500. A clock will be placed in the tower as a memorial to the late Lord Zetland, the cost amounting to £200, being subscribed for by the tenants and others connected with the Upleatham and Loftus estates. The contractor is Mr. Thomas Dickinson, of Salisbury, and the clerk of works Mr. James Patterson. The original drawing from which our lithograph has been taken is now on view at the Royal Academy.

ST. GEORGE'S CATHEDRAL, SOUTHWARK.

WE publish a few details from the above church, consisting of a drawing of the brass gratings over the hot-air chambers, and a niche for the statue of the "Sacred Heart." The conditions were that the gratings were to be emblematical in design, and that both should be in harmony with the structure, the work of the elder Pugin. These additions were designed by Mr. Herbert A. Gribble, and executed by Messrs. Farmer and Brindley, of Westminster Bridge-road.

PREMIATED DESIGN FOR COTTAGE VILLA.

WE this week give an illustration of the successful design of cottage villa by Mr. H. E. Clifford, architect, Glasgow, for the Utilities Land Company, Limited. The villa is designed with the view of producing at limited cost a more picturesque character than is usually attained in small houses that are square in plan. The building occupies an area of 33ft. by 27ft., exclusive of projections. The ground floor contains two sitting-rooms, kitchen, and scullery, with other conveniences. The upper floor, the greater part of which is in the roof, contains four bedrooms, bathroom, and napery closet, the ceilings being respectively 10 and 9 feet high. The external walls would be built of brick with stone dressings. The interior finishings of yellow pine stained and varnished. The upper portion of transomed windows glazed with quarry glass. The roofs to be covered with green slates with tiled ridges.

LATE WROUGHT-IRON WORK.

THESE examples from Chelsea and South Kensington Museum have been chosen by Mr. Penstone from his sketch-book as among the best to illustrate the points of design and construction remarked upon in his lecture read before the Architectural Association on Friday last, and reported on pages 613-6 of our present issue. The fanlight from South Kensington Museum is a fine specimen of 16th Century German work, and the details given clearly illustrate the example. The bits from Cheyne Walk, with the perspective of the gate at No. 16 of the same street, show more familiar work, though probably none the less valuable and suggestive. The German court-yard bell of 17th Century date is exceptionally interesting.

THE IDEA IN PAINTING.

LAST week the members of the Manchester Academy of Fine Arts and of the Manchester Literary Club, with other invited guests, assembled at the Royal Institution, Manchester, to hear a lecture from Mr. Ford Madox Brown on "The Idea in Painting." Mr. Madox Brown, after excepting pre-historic art from his remarks, said that painting was originally representative, but as it developed the love of it as imitation of nature increased, and the modern practice of complete imitation was consequently the natural outcome of the earlier, but the earlier contained the essence of the art. The idea in it, therefore, now claimed investigation. If in the twenty-five years between 1850 and 1875 we could boast of some progress in the material side of painting, it was to the quarter of a century preceding it—the epoch of MacIose, Wilkie, and Leslie, of Delaroche, De la Croix, and Ingres, of Cornelius, Overbeck, and Kaulbach—that we owed the modern vigorous development of the idea as subject matter in painting. Since 1850, indeed, there has been a positive reaction. Epochs had their inevitable duties and channels of progress, and it might be necessary that now lines and poses of delicate tints and the study of what was beautiful *per se* should engross us, but in aspiring to fresh conquests we should be careful not to let slip those we hold already, and against this our voices should be raised. The painters without ideas at all times outnumbered those who had them. It was ever by a struggle that the rarer quality of thought—which was poetry in painting—was kept to the front. There was ever a powerful party among painters who, being without thought or poetry themselves, tried to persuade others that mere imitative painting, with no idea, or only such trite ideas as could be picked up in shop window, was the proper and desirable kind of art. According to this section every subject that represented more than a figure or two, with a snatch of background taken direct off nature, was amenable to the charge of "literary ideas." M. Courbet was chiefly responsible for this school

in France, and pulled down the Vendome Column probably more in hatred of the art which adorned it than of the system it commemorated. It was an idea itself, and it was covered over with ideas, and Courbet honestly hated ideas, for he could not understand them. He was a highly endowed painter and a fine colourist, and that which he could paint best—a study from nature—he wished every one to accept as the only legitimate art. Hence, it would appear sprang up, the impressionists, a school of painters not only confining themselves strictly to what they found ready composed for them in nature, but undertaking to convey only the first impression of it, with the bloom still on it, resulting, as we might imagine, with the clever ones in clever sketches, and in some rather peculiar "splotchings" of colour with the less gifted ones. Any school of art that leaned stoutly on nature must in the end accomplish good, but there was some work left before we consented to abandon ideas which held away in the Greek Pantheon of sculpture, in the Christian art of Giotto, in the renaissance glories of Buonarroti and Raffaele, and of Durer and Rubens and Hogarth. The idea in art began precisely where the literary idea left off, and that which one art was best calculated to express the other was the worst at conveying. Mr. Brown, after saying that art ideas, like other ideas, were not all of the same calibre, proceeded to describe examples of different classes from the works of Cruikshank, Delaroche, and Jerome. The fact that historic doubts were sometimes cast on the incidents presented did not invalidate the idea, for it was not the province of art to supply documents. Architecture and music were limited in their power of expression. Painting, in its turn, gave us a situation in history or in life, something beyond a lyric and within a narrative. It was presented to us with a vividness that out-lived all narrative, and might hint the past and foreshadow the future. In France the idealess painter culminated, and had boldly set up his deficiencies as a school and painted *par preference* the most prosaic object in nature—let us say courageously at once, a shiny silk hat. In contrast to these moderns, the art ideas of Giotto, Orcagna, Mantegna, Sandro, Botticelli, Signorelli, Durer, and Holbein were described with great felicity. The idea in art as such belonged more certainly to early Christian or mediæval times than to the renaissance. Yet the three great workers in that change—Leonardo, Michel Angelo, and Raffaele—were as fitted to cope with others in ideas as in other aspects of art, but owing to the times they lived in, to some thing or law not yet appreciated, it was ordained that they concerned themselves, not with ideas, but with a quality new to art—style. Mr. Brown dated the commencement of the art idea in England with Hogarth, but took Blake as the English type of the painter of ideas in art, and devoted the remainder of his lecture to a sketch of that artist's life and work.

CHIPS.

Providence Baptist chapel, in Castle-lane, Bedford, was reopened on Sunday week after renovation, enlargement, and the replacement of the old square pews by light deal benches. Mr. Young was the architect, and Mr. Hull, also of Bedford, the builder.

The following gentlemen are candidates for the office of district surveyor to the Metropolitan Board of Works for the parish for Putney and Hamlet of Roehampton, the election for which takes place to-day (Friday):—Mr. J. B. Badoock, 7, Staple-inn; Mr. C. W. Brooks, 14, Duke-street, Adelphi; Mr. R. H. Burden, 397, Oxford-street; Mr. A. Conder, 11, Queen Victoria-street; Mr. W. A. Large, 23, Queen Anne's Gate, Westminster; Mr. G. McDonnell; Mr. Alex. Payne, 4, Storey's Gate, St. James's Park; Mr. J. S. Quilter, 10, Brunswick-square; Mr. F. Todd, 36, Essex-street, Strand; and Mr. T. W. Willis, 34, Ely-place.

The Mayor of Leicester on Monday turned the first sod of a new public park near the Abbey ruins and the river. The Corporation have bought 40 acres of land for the park, and the cost of laying it out will be £10,000.

The new line from Stratford-on-Avon, in extension of the East and West Junction Railway to the Eversham and Redditch section of the Midland Railway, will be opened for traffic on Whit-Monday.

The Governors of the Scottish Corporation have decided to proceed at once with the restoration of their hall in Crane-court, Fleet-street, destroyed by fire in November, 1877. The plans have been prepared by Professor Donaldson.

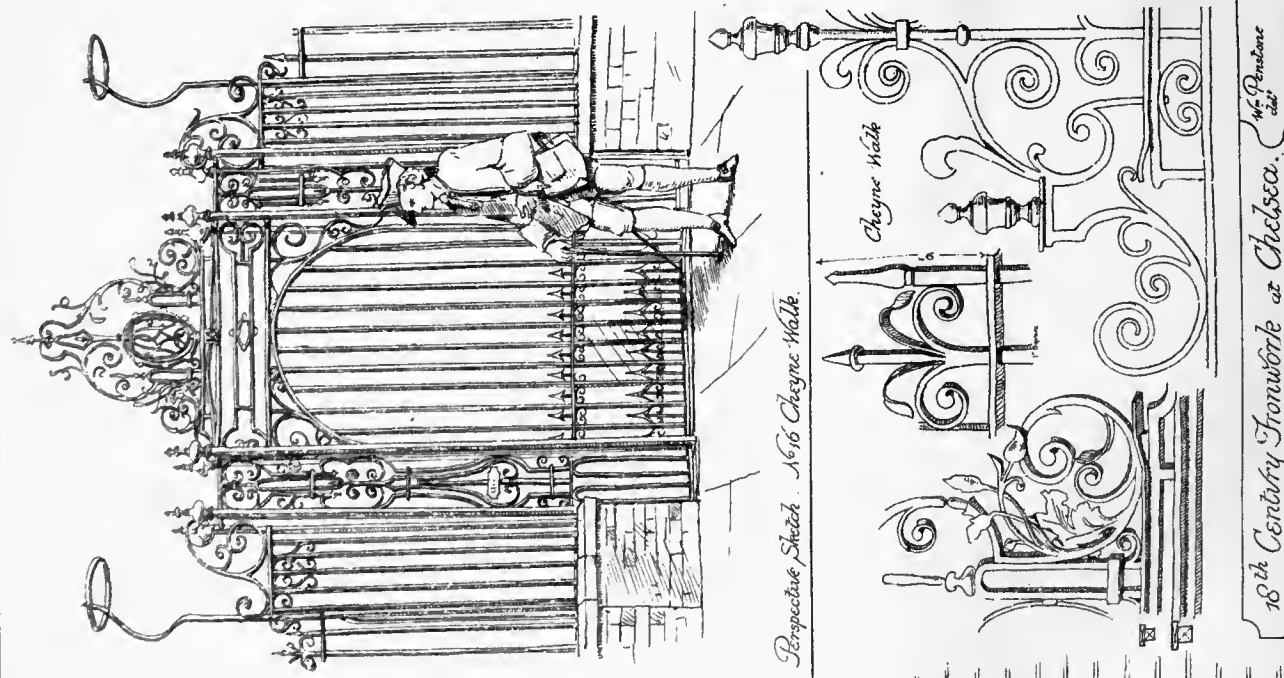
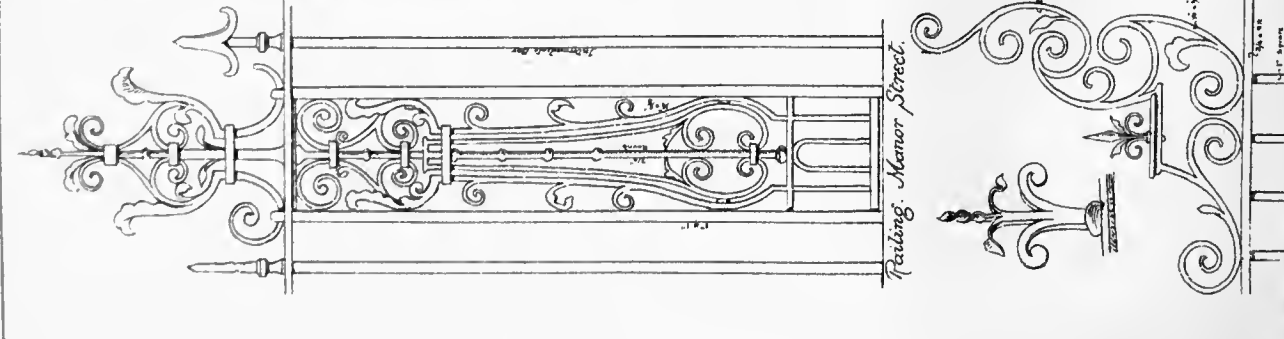


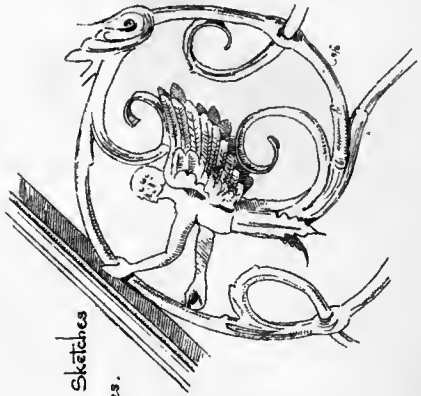
Photo Engraved & Printed by James Ackerman, 6, Queen Square, W.C.



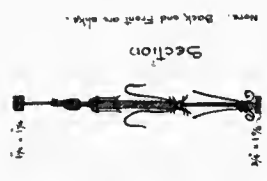
Elevation



Enlarged Sketches of Figures.



Perspective Sketch.



Section

Fanlight of Wrought Iron. 16th Century. German Work.
Covrt Yard Bell of ditto. early 17th Century. Ditto

Bells now in the Museum at South Kensington.

18th Century Ironwork at Chelsea.



St. George's Cathedral Southwark.

Design for Riche for the Statue of the
Sacred Heart and
for the
Brass Gratings
over Hot-Air Chambers.

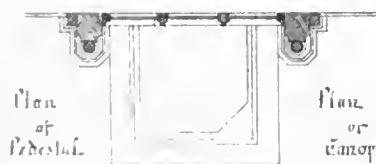
The Riche to be
executed in Oak.



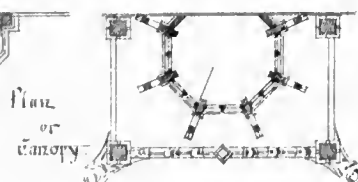
Choir
Shafts

Elevation

Profile

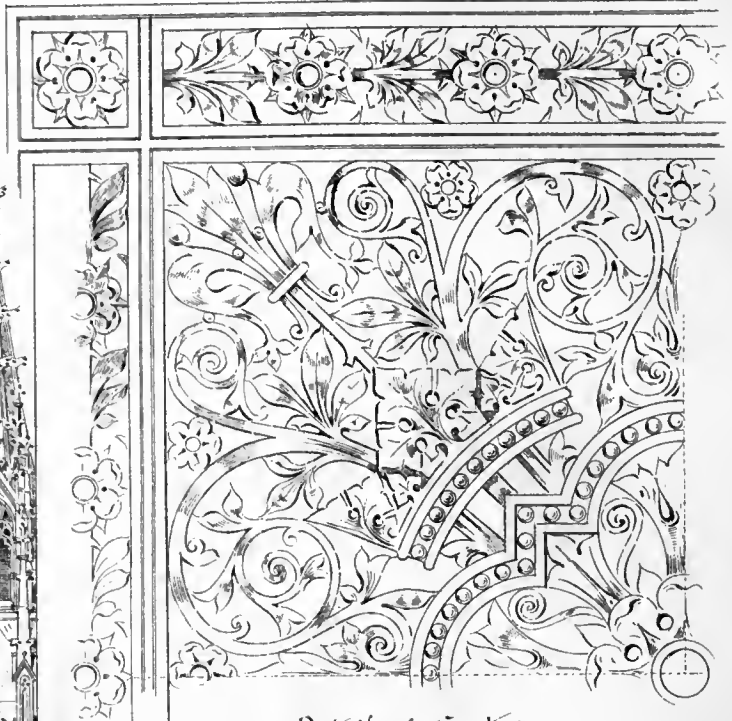


Plan
of
Pedestal



Plan
of
Canopy

Scale of 0 1 2 3 4 5 6 feet



Detail of Grating

Scale of 0 1 2 3 4 5 6 7 8 9 10 11 12 inches

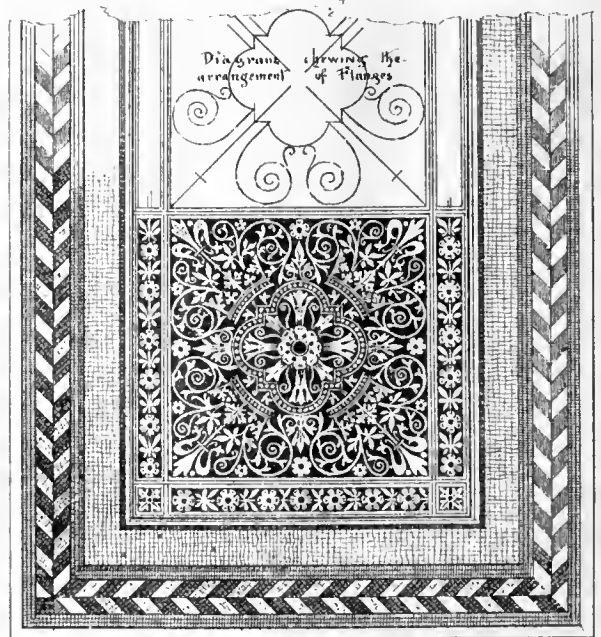
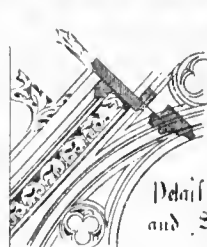
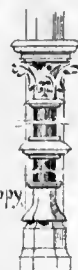


Diagram showing the
arrangement
of Planges



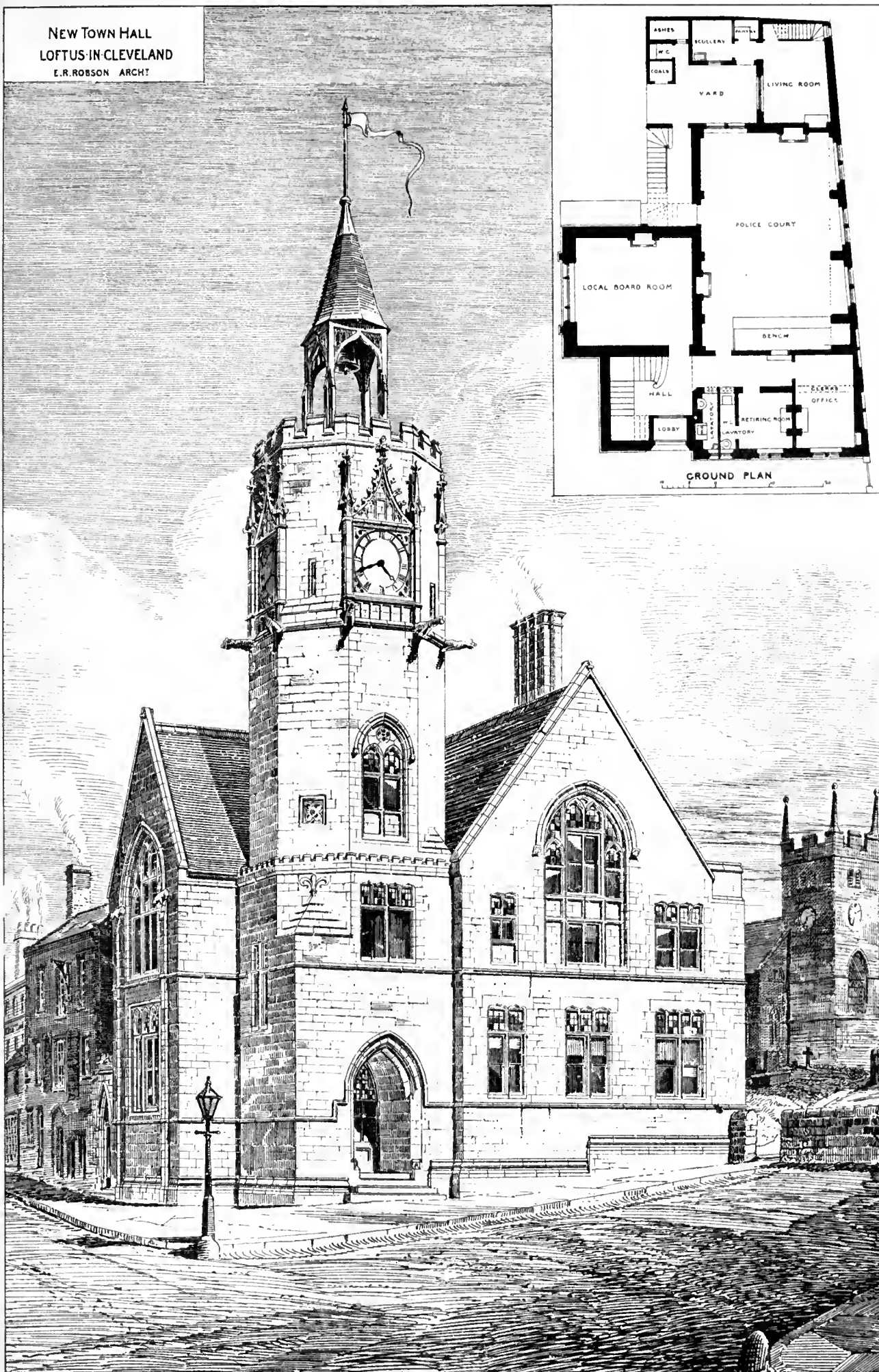
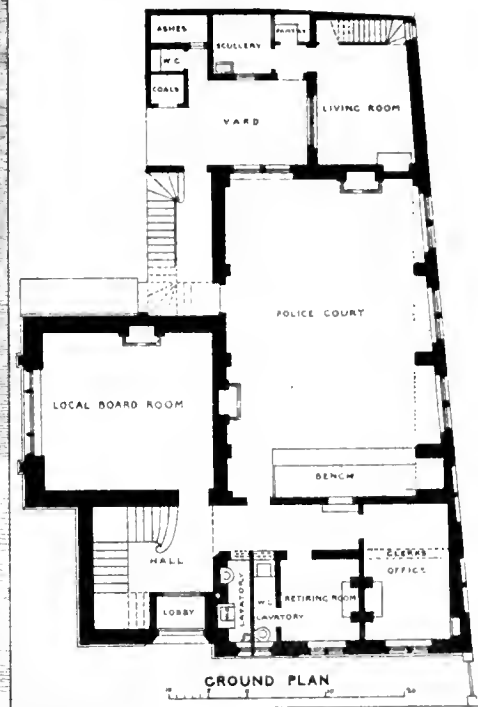
Detail of Canopy
and
Shafts



Decorative Border

HERBERT A. GRIMBLE, M.A.R.A.
ARCHITECT
22, Abchurch Lane,
London, E.C.

NEW TOWN HALL
LOFTUS-IN-CLEVELAND
E.R. ROBSON ARCHT.



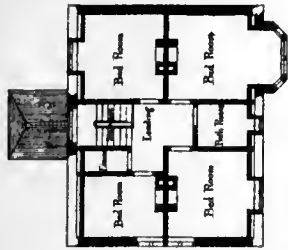
Utilitas · Land · Company:

Premiated · Design · for · Cottage = Villa:

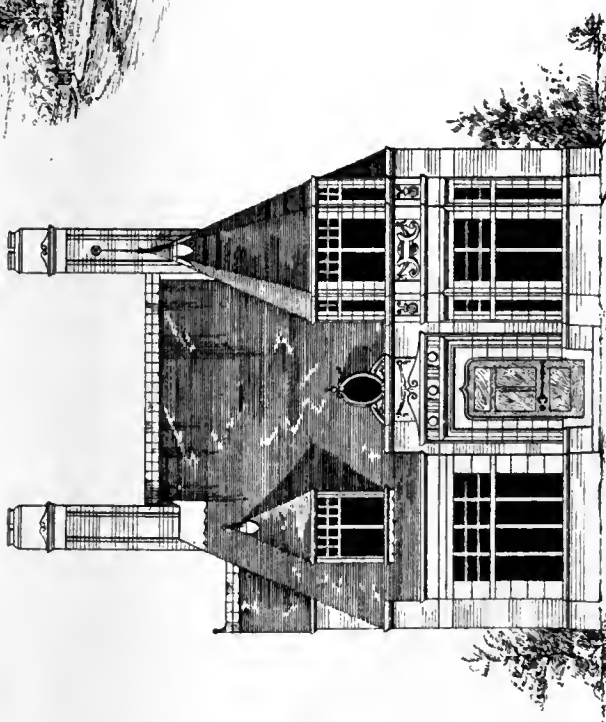
H · E · Clifford · ARCHT.



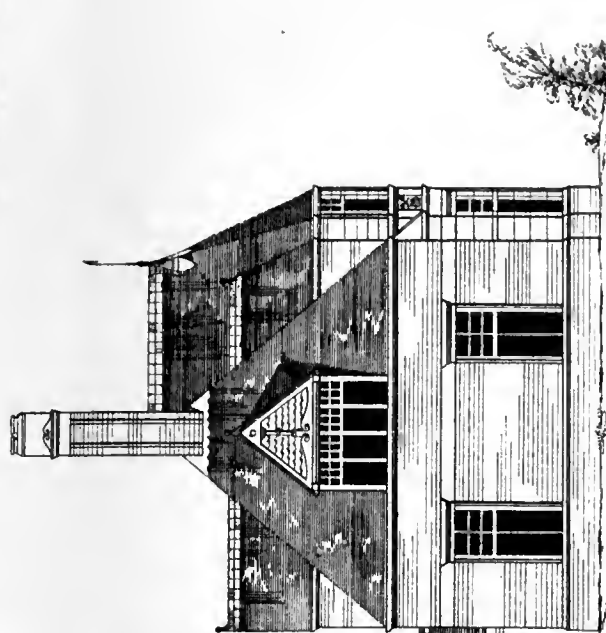
Ground · floor.



Bed · Room · floor.



Front · Elevation.



Side · Elevation.

Scale · for · plan · 1" = 10'

Scale · for · elevations · 1" = 20'





ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the Association was held on Friday evening, the President, Mr. H. L. Florence, in the chair. Mr. John Cowell was elected as a member. A vote of thanks was passed to Mr. Saxon Snell for permitting a visit to be made last Saturday to the new Holborn Infirmary, on the motion of Mr. Page, who stated that the next visit will take place on Saturday, June 7th (and not on May 31st, as originally announced), and will be an excursion to St. Alban's Abbey. The nominations of officers for next session were read by Mr. Hayes, the name of the proposed president being Mr. S. Flint Clarkson. Mr. Page announced that none of the designs sent in under motto this year for the Association sketch-book had been selected, as they were not considered to be equal to the standard. The envelopes containing the authors' names had, therefore, not been opened.

THE ARCHITECTS' BENEVOLENT SOCIETY.

THE PRESIDENT brought before the members the claims upon them of the Architects' Benevolent Society. The society had not been supported as it should have been, seeing the useful character of the work it carried out, and its committee were now very anxious to raise its fund to £5,000. For this object £1,500 was needed, and Mr. George Godwin had offered to give £100, if 14 others, who need not necessarily be individuals, would do the same. It had seemed to the committee of the Association that this would be a very desirable opportunity to perform a good work by undertaking to provide one of the £100 required. Already every one to whom the subject had been mentioned had put down his name, and between £35 and £40 had been subscribed. The Association was the first body to move in the matter, and he thought they would find not much difficulty in raising the sum required; indeed, he trusted that at the next meeting, a fortnight thence, he should be able to announce that the sum required had been subscribed.

Mr. ASTON WEBB said, all must support this proposition of the President, for Mr. Florence had introduced it to the committee and had backed it by a handsome subscription; he trusted all would make it a point of honour to subscribe to the fund.

THE PRESIDENT announced that the annual excursion of the Architectural Association would have, this year, its headquarters in the city of Wells. Mr. Pink, the excursion secretary, would be glad to receive the names of those who intended to join.

LATE WROUGHT-IRON WORK.

Mr. W. PENSTONE read a paper on this subject. Round the walls of the room were hung numerous drawings illustrative of the subject (a selection from which appears in our photo-lithographic pages), and also several actual specimens of brackets, candelabra, screens, gates, and scrolls, lent by Messrs. Hart, Son, and Peard. Among the manipulative arts connected with architecture, that of the smith appealed, the lecturer thought, as strongly as any to the aesthetic mind. There is a strong sense of individual power and skill impressed on one by the contemplation of works of beauty and ingenuity developed from the rough ore, which awakened to its fullest extent the sympathetic interest forming so important a factor in the constitution of an "artistic" nature. The hand that wrought the interlacing scrolls and flowing foliage centuries ago has left its impression on the work so markedly, that it seems, through them, stretched out to us in the universal brotherhood of Art. Unquestionably there is poetry in the subject; from the days of Homer to Longfellow and Mackay, bards have delighted to sing of the glowing forge and ringing anvil, and their music had furnished the *motif* to the great masters of harmony. Believing the sense of beauty in art to be in a great measure dependent upon extraneous associations and influences rather than of a nature to be analysed and scientifically deduced from inherent qualities contained in the objects contemplated, one is unwilling whilst looking at the productions forming the subject of our consideration, to eliminate entirely the element of sentiment, in order to gain credit for a "highly practical" paper.

The metal work of the Renaissance fully partakes of the incongruities, vagaries, and debasements, common in the contemporaneous

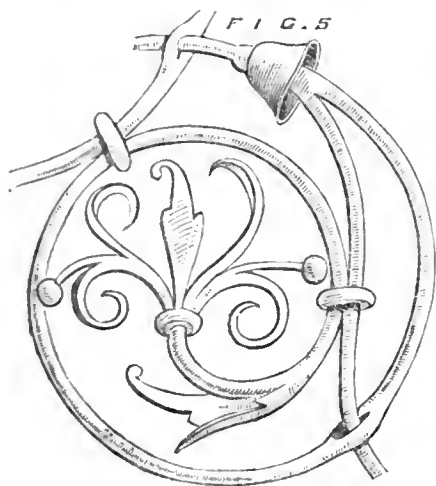
architecture, so irritating to the modern mediavalists and purists, from whose platform it is easy to discover reasons why the greater part of the works of this class should not rank as high productions of art. But speaking generally, as to the art of the period, much interest is awakened and indeed many a lesson may be learned from these very vagaries—the outcome of an age when the increase of populations was leading to a spirit of restlessness, and travel, and the struggles between old formulas and new ideas developed constant incongruities and piquancies in the vigorous life so strongly reflected in the literature and art of those centuries. And in the new motives and fresh impetus given to art-workmanship at this time, may be found ample field and principles for study and judicious imitation, without reproducing extravagancies for the sake of quaintness or making precedent of failures. It is worthy of remark, that whereas in the Earlier Gothic period, the ironwork has a character of its own, consonant with, but not in imitation of, the other architectural details of the time, in its later developments the ornamental forms of wood and stonework, were adopted by the smith, and wrought with wondrous skill and finish, but with a corresponding loss of power. The introduction of sheet-iron into use during the 14th Century, brought into play other tools than hammer and tongs, and although the new form of material was at first used with the simple adaptiveness and propriety so characteristic of the mediæval workmen, the greater ease of manipulation in time led to over elaboration and imitation in lieu of natural treatment of the material. At the end of the 15th Century we find the work of the smith in locks, hinges, railings, &c., with all the detail characterising the contemporaneous stonework. Traceries, crockets, finials, and foliations, are executed by means of overlaying plates in many thicknesses, chiselled, stamped, and chased. But the iron industry was now growing with great rapidity and assuming a more important place than it had hitherto occupied. In the next century the southern forests of Germany and our own timber districts were glowing with furnaces, and with the increased facilities for the production of the metal came increase of power in dealing with it as an ornamental material. In the hands of those artist workmen who, encouraged and protected by the municipal systems, added so much to the power and wealth of the great independent or semi-independent cities of Central Europe, metallic design was developed with a vigour and freedom which left behind the architecture of the age—then in the efflorescent decadence of an exhausted style. And although this branch of work partook of the infusion of Classic detail, with which, as with new blood, it was attempted to reinvigorate constructive design, it did so in a perfectly natural and adaptive manner. For the best examples of the work of the 16th and 17th centuries we must turn to Germany, certainly for the most numerous. The great imperial city of Augsburg and its neighbours seem to have specially fostered the art of the smith. The hinges and other ironwork on doors of the town hall at Augsburg, a building erected at the commencement of the 17th century by Elias Holt, are very good examples of the treatment of flat-iron, cut into scroll interlacing patterns, lined and worked up with the chisel. There is a peculiar character about this class of German work. The curves seem to have been suggested by the tentacles of the starfish. Work of similar character is to be found at the Dom Kirche, which also contains some good railing. This latter, however, whilst showing a close grille of excellent design and a beautiful corona of flowing scroll-work, is spoiled by the extraordinary freak of representing at the bottom a platform surrounded by balusters in perspective on the vertical plane! There are two or three railings of much beauty enclosing the chapels of the great Fugger family in the Cathedral of St. Ulrich, the moulded baluster standards of which deserve attention. The railing enclosing the Augustus Fountain is a very remarkable work, consisting of a much enriched corona of scroll work above moulded uprights. The cloisters of St. Anne's Church also contain some good work. At the Three Moors hostelry in the same city, in the chamber shown as that of Anthony Fugger, is an iron stove, dated 1532, ornamented with scenes from the wars of Maximilian I. Augsburg especially excelled in the use of the cold chisel and in chasing. Besides sword and dagger handles treated in this manner, detached

statuettes were carved out of the hard metal. Considering the much greater adaptability of other and mixed metals for this purpose and the rapid oxidation to which iron is liable, one cannot but consider such labour as in a wrong direction. One of the most elaborate works of this description is now at Longford Castle, near Salisbury. It is a chair presented by the city of Augsburg to the Emperor Rudolph II. It is decorated with small statues and reliefs representing events in the history of Roman emperors, and most highly wrought and chased. It is the work of Thomas Ruker, A.D. 1574. It is of course entirely out of our province to take up the subject of arms and armour, which at this period received the highest decorative skill of the smith, and such works as these may be relegated to the same class. This paper is not a catalogue of the chief works in iron, but is intended merely to point out a few accessible examples which are worthy the attention of the student. At Salzburg, Austria, in the cemetery of St. Peter are several grilles to tomb entrances of the 17th and 18th centuries. The best of these is that of the Zillner family, 1610, a good design with the prevalent round iron scrolls, flat leaves, and repoussée masks. It is this period, that of the 16th and earlier part of the 17th centuries which furnishes the best examples of iron treatment, fully equal to if not surpassing any previous efforts of the smith in Germany, even at the best period of Gothic work. Most of the examples already quoted belong to this era, and much work of the kind may be found scattered over Germany. Nuremberg, as might be expected, contains many specimens. One interesting piece is the railing round the Schoen-brunnen fountain, the work of an Augsburg smith, named Paul Koen. This encloses a fine structure of pointed work, and the feeling in cusplings to cresting and buttressed standards is decidedly that of the Late Gothic, but the character of the foliage and scrolls to standards is of an independent type. The grille itself is of a pattern much used, cross diagonal bars form a diamond pattern, those in one direction being placed square and in the other edgewise, the former passing through the latter. Scattered upon this ground are sprays of foliage and geometrical patterns entwining and interpenetrating the bars. Another example of similar work may be found in Vol. III. of "Architectural Association Sketch-book," in a grille to a house at Frankfort, sketched by Mr. Aldridge, and on the same plate is a drawing of gates to a chapel at Cologne, which is very suggestive in character, the lower part being filled in solid with wood and flat iron. The ancient Nuremberg houses contain many grilles. One very fine one is that to No. 37, Winkler-Strasse. There is a fountain of simpler character than the Schoen-brunnen in the Ebner-Strasse. Riveting in this work is rarely resorted to. In the flat iron, the intersecting bars are halved and welded, and in the prevalent round-bar work they pass through eyes in the opposing stalk. The branches are well welded on, the larger ones often uniting inside a cup terminating the main stem. The lines generally flow easily out of one another, spiral patterns predominating. The round, smaller stalks flatten into sprays of small leaves whilst the larger terminations are cut from the sheet in the form of leaves of foliated masks



These were often painted and gilt or repoussée, and lined with the chisel. Quaint forms recalling,

perhaps representing, the gnomes and dwarfs with which Teutonic imagination peopled the depths of the forest and recesses of the mine, are very generally introduced, being boldly indicated by the chisel in the flattened iron. The work displays a suitable amount of finish, but the marks of the forge are not obliterated by the file. But the most noticeable feature of the Early German Renaissance work is the beautiful flower termination so generally used, and which was a triumph of just conventionalism. The petals, stem, calyx, leafage, and buds are represented in an illustrative and general rather than an imitative manner—a treatment more in accordance with true principles than the closer renderings of specific flowers, beautifully executed as these are found in later work. These terminations severely test the powers of the modern smith in reproduction, being formed by intricate pieces not riveted or soldered, but welded together from the furnace. (Indeed, there are many operations of the old smiths which appear to have been lost, as, for instance, that by which the railings to the tomb of the Emperor Maximilian at Innspruck are formed. Here leafage, undoubtedly of repoussée work has been applied to the baluster-formed uprights in such a manner that it appears as if wrought in one piece.) There is a very careful drawing by Mr. Anderson in the last volume of the A.A. Sketchbook of one of the flowers I have referred to, and I have here (Fig. 5) a specimen of the simplest form.



At Munich some good street work yet remains. The church of Notre Dame formerly contained some very fine enclosures of early 17th century work, but during its restoration in 1860 these were taken out and probably destroyed, a fate that has too often overtaken ecclesiastical work of this description during the earlier stages of the Gothic restoration movement. At Bremm, on the Moselle, there is, I believe, a curious iron pulpit dated 1663, but I have not been able to find any illustrations of it. From the end of the 16th to the middle of the 18th century it was everywhere the custom in Germany to ornament tombs with iron crosses. They have been very generally removed, but in some instances are preserved in the vaults belonging to the burying ground. These were generally painted in oil and part gilt, and have often a small locked box or reliquary at intersection. A good specimen of the general style of these may be seen in the South Kensington collection in the form of a cruciform candelabrum; also some examples of cruciform suspenders used in lighting churches. Cressets or torch-holders and other funeral furniture in wrought iron of the 16th and 17th centuries have been often preserved in churches, and the Cathedral of Cologne possesses some remarkably fine examples of these. There is some good ironwork in the cathedrals of Ulm and Ratisbon. The work of the period which has been dwelt upon is characterised by a boldness and vigour which later became much refined upon. The features and details of Classic art, which in Italy were re-developed with a refinement due to the presence of the ancient models and the character of the people, received at the hands of the northern smith in their earlier introduction a very free translation, in which the element of

what may be termed elegance was often entirely lost, whilst that of power was intensified. (A remarkable exemplification of this spirit in art will be doubtless familiar to students of the great master of the German Renaissance, Albert Durer, whose sketches and adaptations from works of the Italian painters, display a total indifference to their refinements, and exaggerations of their most forcible points.) In truth, until the 17th century the influence of the revival was but little felt in German metal work, the artists in which, taking a departure from the forms of the later Gothic, had formed in the previous century or so a school of their own of great originality. But the Thirty Years' War paralysing the industries of Germany seems to have stopped the full development of this national style, and the country never recovered her pre-eminence in this direction. The work of the latter 17th and 18th centuries succumbed entirely to the classic spirit everywhere triumphant, and except for a somewhat sturdier rendering, there is little to characterise this later work from that of other countries. The execution is always good. We have sketched a small panel and hinge from South Kensington Museum, which shew the usual character in its best forms. Rich work of the heraldic "lambrequin" character was often compiled by various flat pieces, overlaid and welded at the stem, but branched, twisted, and curved in various directions as they develop. In Italy, naturally the return to classical traditions appears at a date anterior to their acceptance in other countries. Thus in the well-known lantern and torch-holder affixed to the Strozzi Palace these forms are adopted at a period when work of the pointed style was being carried on everywhere. They are the work of Niccolo Grasso, about 1480. The warm climate of the South led to the extensive use of balconies and railings and openwork window panels, which may be found in great profusion in most of the Italian cities, especially Venice—mostly of 17th and 18th century date. They are usually of scroll treatment in a combination of flat and round iron with moulded bands, devoid of applied or cut leaf work, but of an infinite variety of pattern, re-entering curves being very generally used. Close diaper grilles with rosettes are, however, frequently met with. In the lighter forms what may be called "riband work" is much employed, the iron used being of the thickness of $\frac{1}{4}$ in., doubling upon itself and confined to the shape required by ties of thin metal. Beautiful chains of this description were used for hanging lamps, and are frequently picked up by the fortunate hunter in brack-a-brack. Stands for majolica bowls are another form in which much fine work was executed by the smith. France possesses some very good forged work, although it is not nearly as plentiful as in Germany. This may be in part owing to the excesses of the Revolutionists, who, however, like our Ironsides, were doubtless credited with more destructiveness than is their actual due. In the wholesale demolition of chateaux and desecration of churches, such easily removable work as iron gates and grilles has doubtless disappeared to a large extent. Paris, however, contains many examples of fanlight open-work, chiefly of late date. Two of these, of the end of the 16th century, are well worthy of remark. One is from a door of the Church of St. Nicolas des Champs, semicircular in form, fixed in two halves in wooden frames; fleur-de-lys ornaments cover the points of contact of the bars and rosette terminations are used, formed by many thicknesses of serrated sheet iron; the initials S. N. and S. J. occur in the centre. A fanlight somewhat similar is to be found in the Rue St. Paul. The Louvre contains a work of the smith which, like our Hampton Court screens, is monumental in character, and affords the best example of this industry in France at its best period—I refer to the two gates in the Apollo Gallery. (Perhaps some of my hearers well acquainted with French architectural literature may be able to refer me to good illustrations of these. I have been only able to discover an engraving of one of them which does not do it justice.) These magnificent specimens were discovered in the reign of Louis Philippe at the Chateau de Maisons, Laflitte, in a sadly neglected state. They are of late 16th-century date, and one is said to be the work of a Frenchman, and the other of a German. They have been very carefully restored, the firm into whose hands they were entrusted having practised their workmen for months on

similar work before taking them in hand—a contrast with the treatment of our Hampton Court screens, which have been very indifferently repaired. The Louvre gates are of a purer Classical type than ours, and the details of construction are better. The structure of the design, however, is too directly imitative of wood paneling, and there is much repetition in the forms. These possess much grace of outline, and the top panel, representing Amorini crowning Time, is a most beautiful composition. At the Lycée Napoléon is a 17th-century grille of good design in five panels—those at bottom being well-filled with a pattern of many parts, the centre ones with open upright bars, and the top large panel occupied by a shield surrounded by flowing scrolls. There are some balconies typical of the 13th-century style at l'Ecole Centrale des Arts, formerly l'Hôtel Salés. In late 17th-century work the lines of the design in iron follow very generally the contortions characterising the school of decoration termed "Rococo," the applied ornament is often of bronze. At Fontainebleau is a wrought-iron railing surrounding the meat of 17th-century workmanship, and similar enclosures may be met with in a few of the chateaux remaining of this period. The Cathedral at Rouen contains a railing of the reign of Louis XIII., enclosing the chapel of St. Eustache. At Naney, in the 18th century, Jean Lamour, smith-in-ordinary to Stanislaus, King of Poland, executed many remarkable works in iron which are amongst the cherished monuments of the ancient capital of Lorraine. They have been illustrated in a special work. At Toulouse, in the Museum Garden, is a well with ironwork of the 17th century of somewhat eccentric design. A similar example of the same period may be found at Mothault in Belgium; and there is one in the Hôtel Cluny, Paris. Window panels of similar character to the Italian ones we have mentioned, and altar rails of like design may be found in provincial towns, more especially in the southern provinces. We have here sketches of some from La Ferté Bernard and Nogent-le-Rotun. The diligent explorer may find some few of the old sign-brackets remaining in Paris and other cities, from which were displayed the trade marks or insignia once in universal use amongst tradesmen, but now used only by publicans and pawnbrokers. These were often of elaborate construction, as the examples now at South Kensington. Also, though now very scarce, there are, I believe, to be found some of the old "Lanternes" of decorative character from which were suspended the oil-lamps used in street lighting, and which acquired so terrible a significance during the First Revolution. A most interesting and quaint work on iron was published in the year 1627 at Laflèche, by one Mathurin Jousse, a provincial working smith, who also issued treatises on perspective and carpentry. It contains a number of designs, chiefly for locks, keys, and similar work, which are marked by great spirit and invention. The original work is very scarce, but it has, I believe, been partially reproduced in facsimile. The elaborate door furniture produced in Italy and France during the 17th and 18th centuries, forms a subject in itself, and has, I believe, been so treated in a volume lately published in Paris. The knockers especially are of great variety and richness, containing often groups of figures executed in the highest style of art, such as the well-known one at the Palace Pisane, Venice, representing Neptune and sea-horses. These, however, belong more properly to the art of the sculptor and founder, rather than to that of the smith. Many examples are produced entirely by chisel and file. But the simpler varieties, such as two I have sketched at Caudebec, will often afford good hints for the treatment of ordinary work. There is a fine knocker brought from Paris, at Barnard's-Inn, Helbern.

In this rapid sketch I can but just allude to the work in other countries. That in the Low Countries assimilates in character to the French, although perhaps heavier in style. At Forêt, near Brussels, in the church of St. Denis, are some good gates, date 1760. At Bruges may be seen some few wrought-iron finials to its many gables; note one in the Rue du Fil, dated 1628. Spain possesses much remarkable work in iron, characterised by the ornateness displayed by its architecture. In Switzerland also some fine work may be found in window grilles. As I have remarked about the German, so in the work of Italy, France, Spain, England, and the Low Countries,

the national distinctions in style are but faintly marked from the 17th century. Scrolls, masks, acanthus, and other leafage, urns, the spear, shield, and sword, and other forms, all modelled on distinctly Classic precedent, are used in a similar manner in all countries to produce works of great richness and beauty, but which often convey a sense of over-elaboration and artificial effects unsuitable to the material. In Germany, as we have noticed, the rendering of this Classic detail is vigorous rather than elegant; in France the facile and versatile spirit of the nation is displayed by graceful combinations of curvature and easy adaptations from antique models; in Holland there is often an affected quaintness; whilst in our own country there is to be discovered a certain sense of fitness—a degree of independence which makes much of our work most valuable and suggestive. But these differences are of so subtle a nature that it would require a much more exhaustive paper than mine to analyse them, and we must remember that the interchange of work and workmen among the different nations tended much to obliterate local characteristics.

I must now proceed to the home view of our subject. The metal work of our Perpendicular Period is of a very high class, though the forms are of marked architectural character. The inclosure to Henry VII.'s tomb at Westminster (in bronze or latten) is perhaps the finest example of such work to be found; and the railings to Edward IV.'s tomb at St. George's, Windsor, is a marvel of elaborate construction. Both of these are probably the work of foreigners, the latter being popularly ascribed to the hand of Quentin Matsys. I have not been able to discover any conspicuous examples of ironwork of the Elizabethan age, though much of the smaller work in lock-plates, hinges, &c., remains. In Exeter Cathedral there is a door-plate in the form of a crown, of 16th century date, and the city itself possesses an interesting relic, probably of early 17th-century workmanship, in some mace-holders of cut and chiselled sheet-iron, coloured red and green, and parcel gilt. The vestry-door to St. Saviour's, Southwark, has a handle in the form of a ring, with lizards on it, of the same date. At Hurst Church, in Berkshire, there is a curious wrought-iron bracket for hourglass, date 1636, painted and gilt. In most of the old Elizabethan mansions much useful work in the form of door furniture, though generally of a plain character, may be found. Eastbury House, near Barking, furnishes some good examples of these. The Ashmolean museum at Oxford has a fine lock plate of a more ornamental description.

I have here some sketches of a work of the Jacobean age which is a very good example of the powers of the English smith. It is a screen formerly separating the pew of the Leversedge family from the Lady Chapel in the Church of St. John, Frome. I consider this specimen singularly happy in design, and delicate in execution. The composition gives due importance to the central feature bearing the armorial shield, while the side panels are agreeably diversified. The general size of main bars is $\frac{1}{2}$ in. by $\frac{1}{2}$ in. or $\frac{3}{4}$ in. The lines of hammered work are not obliterated by sheetwork, although there is quite sufficient of this latter to give a richness to the design. Altogether, there is what may be called a restrained freedom about this piece which is very pleasing. It has recently been added to the valuable collection of ironwork at South Kensington. Later in the 17th Century we come to a series of examples which are probably well-known to all London students, the screens from Hampton Court. They are 12 in number, and were formerly placed at intervals of 50 yards in the fence dividing the palace home park from the garden. They were, however, dropping into decay, and removed to the palace to preserve them. Seven of them have been for some years placed on loan in the Kensington Museum, and some of these have recently been placed in the building at Bethnal-green. Huntingdon Shaw, blacksmith, of Nottingham, is recorded as the artificer who constructed them about 1695; his monument may be seen in Hampton churchyard. The screens are of large dimensions, about 13ft. wide by 11ft. high, and altogether exhibit a surprising amount of labour and ingenuity. The general construction of the whole series is on one pattern, but four of them are of richer detail than the others. Panels 2ft. 4in. wide, formed of uprights 2in. square, filled in with a pattern of 1in. bars, and sup-

ported by stays, form the supporting standards on either side. Between these is a flowing composition of elliptic scroll work, with bold appliqué foliage and flowers, surrounding a panel about 3ft. square, which in the four principal screens enclose representations of the national emblems, the rose, thistle, and harp, the remainder being filled in with a diaper pattern. Above this is a heavy swag or chain of flowers, pendant from the beaks of eagle-headed scroll terminations, and crowning the whole is a foliated mask with a figured and tasselled apron. The BUILDING NEWS of 1877* contains a good illustration of one of these screens. All the detail is most wonderfully wrought out, the small rose buds and sprays being represented with great fidelity to nature, as if in imitation of the work of Grinling Gibbons in wood. But a naturalistic treatment, however suitable for the material in which the latter artist worked, is not at all so for iron. The ornament is almost entirely of an appliqué character, the larger scroll ends are even cased with sheet-work. It is very surprising that, notwithstanding the care displayed in the formation of these details, the whole is very badly put together, and it is no wonder that the influences of time and weather were speedily bringing these fine works of art to ruin. Very few of the scrolls or stems are welded at their junctions, but are simply united by iron tongues and pins, the heavy strains on which have in some instances caused them to give way. The leafage too, which in the most ordinary gate-work of this period was always welded to the stems from which it springs, is here merely riveted or screwed, the larger branches in several pieces. Notwithstanding such defects, however, these works must always be objects of admiration from the boldness and originality of their design, and the evidence of patient skill in their production. There are other productions of the smith at Hampton Court Palace well worthy of attention, such as the balustrading to the King's and Queen's staircases, the work of a Frenchman, though doubtless from designs by Wren. Of great importance, and doubtless familiar to most of you is the ironwork of St. Paul's Cathedral, by the same artificer as that last-mentioned one, Tison, a Protestant refugee. These have also been illustrated in the BUILDING NEWS.† The hand of the master designer is here very apparent, although probably very much more was left to the workman than would be the case under our present system. The gates to the choir are noble in design and proportion, and exhibit a refinement, compared to the Hampton screens, which may be partially due to the nationality of the producer. In those facing the nave, exception may be taken to the imitation of fluted pilasters in open work, and to the flattened flaming urns at the top. I do not think the urn-shaped standard terminations at all an inappropriate form, but I do consider them unpleasant if in the flat, especially if the smith attempts to put them in perspective, and more especially when he represents them as if seen from the clouds, as in the Leversedge screen.

The side gates display neither of these defects, the panelling being filled with close scroll work, and the corona containing scenes for large candles, 23 to each screen. Nevertheless, we lose the vertical treatment in the gates, which gives so much more value to the flowing work above in the others. The grilles at back of stalls, the balustrade to gallery round dome, and the work to geometrical staircase are, especially the latter, worthy of study. In some of the City churches yet remaining may be found interesting pieces of ironwork. The church of St. Paul, Covent Garden, contains some good work of a subdued design, harmonizing well with the remarkable structure. Many of the entrances to parks, public buildings, and mansions of the reigns of Queen Anne and the early Georges display noticeable gate work on a large scale. A list of these, if made, would be of some length, but useful to the student. Amongst the more remarkable, we may mention the gates to Clarendon Press at Oxford, 1712, these at Trinity and New Colleges in the same city, the gates to Temple Gardens, 1730, and to Gray's-inn, 1723. In the older suburbs of London, and in many provincial towns, one's attention is often drawn to the home-like dwellings of the last century, with fore-courts

enclosed by wrought-iron railings and gates. Chelsea, Hampstead, and Clapham, contain many examples, and through the medium of the Association sketch-books I have been able to place many illustrations upon these walls. (See lithographic illustration.) It is amongst this domestic work rather than the more ambitious efforts of the smith, that the student of design will find most valuable motives and ideas. There is always a sense of fitness for the purpose designed, and generally a temperate use of ornament other than constructional; that is, the hammered bars and scrolls are not overlaid with sheet work, but depend upon the variety of curve and pattern into which they are wrought for richness. The natural structural composition of an open enclosure, that of upright bars, is seldom lost sight of, the leading lines being vertical and the scroll work being kept in subsidiary panels, or confined to the heads and principal standards. The gates themselves are often quite plain, the ornament being confined to the frame surrounding them. The flowing work, of beautiful design, gains much in value by being thus temperately employed, and the whole composition embellishes the building of which it forms a feature without disturbing its repose. Often unpretending enough, such work impresses one as that of men who gave their hearts to it, though it was usually produced in humble smithies. The careful and often excellent work turned out from our modern art factories somehow seems to lack the power of interesting you in its producer as this old work does. Doubtless one reason is that it is too perfect. You never see a curve gone slightly wrong, and the leaves are cut too closely to pattern and too well balanced. You can picture the old smith pausing to consider which way the curve should now be turned or what twist to give the spray of leaf; possibly arguing a point of broken flexure with the idling critic, or interrupting his work to shoe a passing traveller's horse, and hear the latest news of Marlborough's wars the while. One's mind would scarcely dwell upon the art-metal workman of the present day tracing down on the sheet careful details of elaborate foliations.

Before the opening up of the northern and midland coalfields, smelting operations were carried on in such forest districts as still afforded abundance of timber. In the reign of Elizabeth it was foreseen that the great demand for fuel to feed the increasing number of furnaces would tend to the rapid exhaustion of growing wood. Various repressive statutes were enacted prohibiting the establishment of works altogether in some districts, and limiting them in others. The Weald of Sussex and portions of the neighbouring counties, were the nearest source of supply to the metropolis. The earliest specimens of castings came from this district, and the "Sussex iron," in the form of andirons, or fire-dogs and fire-backs, is well known to the collector and dealer in "antiques." The decorative work in the fire-backs is especially noticeable in the 17th and 18th centuries, some very elaborate compositions being produced, but always marked by a suitable or plastic treatment. The fine railings around St. Paul's, now being refixed, were the produce of a foundry at Lamberhurst, in Kent, and are good specimens of the right treatment of cast-iron railings. The Sussex furnaces were finally extinguished in the middle of last century. Their history is an interesting one, and may be found in the volumes of the "Sussex Archaeological Journal." I have not the space to go into the question of cast-work, to the abuse of which useful manufacture we owe the pretensions, vulgar, and uncomfortable accessories which have disfigured our architecture to so great an extent. The subject of iron design in the present day has been taken up by abler hands than mine. I only feel it incumbent on me to urge the necessity of making oneself thoroughly acquainted with the different phases it has gone through in the periods I have been dwelling upon. In the earlier German, and the simpler forms of our own 18th century work, we have models of a natural and, therefore, artistic treatment of material which will repay close study; and I am sure each of these periods might be advantageously treated of in a more detailed and technical paper than I have been able to put before you. I have now only time to indicate one or two points wherein I think such work offers useful guidance to the designer. The most natural way of employing iron in an

* May 11th, p. 464, Vol. XXXII.

† Published May 18th, 1877, p. 488, Vol. XXXII.

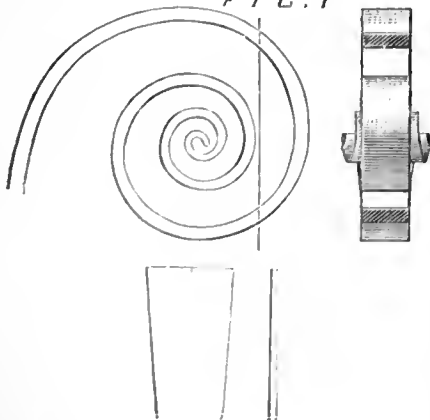
independent manner is surely that of an arrangement of bars or lines, connected together in a constructive manner to combine lightness and strength. These bars may be manipulated in various ways: of sections round or square, or moulded; and the combinations of curved and straight lines offer an endless variety of patterns. Decorative work of lighter form, in which the sheet-iron is brought into play, may be applied, to a certain extent only, without interfering with the sense of stability given by the preponderating forged work; and this is always the principle of the earlier smiths, though generally lost sight of in the more important works of the later centuries, when the forged work was often but a constructive frame concealed by the application of decorative forms. Large mouldings imitative of those in stone and wood were formed out of sheet-iron, inclosing the bars supporting the structure, whilst cut and beaten work, highly wrought and made up into imitations of natural foliage, human forms, draperies, and other objects, frequently attached by rivets only, crowded the whole composition. Now in the German work the figures which were often introduced were usually continuations of the scroll bar, out of which they were worked in the solid forming part of the structural composition, though often with wings and foliations of sheet work attached. (See Fig. 6 and lithographic illustration). The

FIG. 6

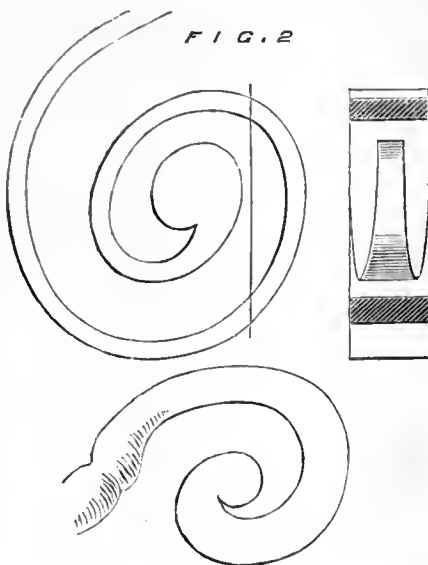


leafage grows naturally out of the main lines, to which it is kept in subordination. The terminations of the voluted scrolls, are points of the design which fitly receive ornamentation, and this detail alone is deserving of attentive study. Although the use of applied sheet work in the form of flower or geometrical rosettes—is here quite a legitimate form of enrichment—we find that, very generally, sufficient effect is produced by simple treatments of the hammered bar. A great variety of these may be evolved out of the two principles of spreading the end—in one case in the depth of the bar, in the other in its width (see diagrams Figs. 1 and 2).

FIG. 1

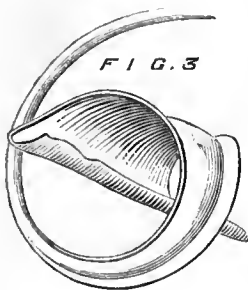


and flat iron are generally found used together in our English gate work, giving a diversity



to otherwise similar forms. By welding an additional metal (Fig. 3), and by a combi-

FIG. 3



nation of the two principles—with alterations to the sectional form of bar, many other developments may be obtained, of which we have here one or two examples, chiefly German. Or the termination may be hammered and chiselled, or stamped (as usual in modern work) into dog-heads or geometrical patterns. In all cases where exposed to probable rough treatment, these methods are preferable to the use of cut and beaten ornament. As an example of consideration of fitness for purpose, I should point to a gate of German work now at South Kensington. It is of a close diaper pattern, a fleur-de-lis ornament being formed on the upright bar, by stout hammered foliations welded on. The points, of which there are many, are all carefully turned well inwards, and protected by the enclosing bar work. Rounded clips are used, and it is quite possible to lean or be pushed against the gate without risking tatters—a desideratum which is too frequently lost sight of by the modern designer. As a general rule, I do not think ordinary protective enclosures require highly ornamental display. The area railings of last century, which are familiar to us all, with their standard panels at intervals in the assemblage of square bars, are to my mind much more satisfactory in a long frontage than elaborate patterns. The bold forms of the spear-heads and occasional scroll ramps, with the now obsolete lamp-brackets and torch-extinguishers, quite sufficiently relieve the designs from tameness—a failing which this material suffers less than any other, and which is often most conspicuous in the most ornate work. There is often more character in a simple forging than in many pretentious patterns drawn from the sand mould, as a comparison between the spear-heads I have mentioned and the usual run of cast railing will testify. And I would repeat again that the great lesson which all old work impresses upon one is that the refinements of the file, scissors, and pliers, should not be allowed to emasculate the vigour produced by hammer, tong, and chisel. In what I feel to be rather too sketchy a paper, my endeavour has been to interest the architectural

student in a subject worthy of careful attention. The present phase of the somewhat erratic course by which modern art progresses has brought the periods I have been referring to to the front. Whether it is a mere passing craze—as some would have—and we are to return to the earlier work; or whether, having run through the styles of all centuries, from the 12th to the 18th, to get our hands in, we shall now satisfactorily develop a 19th century school of distinct character, is a question I should not care to discuss. But of this I am sure—that all earnest, laborious work, of whatever age or style, is worthy of study, and the lesson of thoroughness may well be learned in these productions of the forge. “The smith also sitting by the anvil and considering the ironwork; the vapour of the fire wasteth his flesh, and he fighteth with the heat of the furnace. The noise of the hammer and the anvil is ever in his ears, and his eyes look still upon the pattern of the thing that he maketh. He setteth his mind to finish his work and watcheth to complete it perfectly.”

BILLS OF QUANTITIES: THEIR PROPER RELATION TO CONTRACTS.*

(Continued from p. 567.)

I SHALL now take up the second part of my subject, and

II.—Examine critically the distinctive characteristics of the three systems just described. First, then, let us criticise the London system with its modifications as practised generally throughout England and Ireland. Not many years ago, before it was customary to supply quantities, the London mode of procedure was theoretically right, though somewhat inconvenient for contractors—the architect showed and described exactly what was wanted and left the contractor to find out by any means he thought proper what the work would cost. The issuing of the quantities by the proprietor or his agents, however, makes a fundamental difference. One good feature remains, namely this, that if no changes are made after the contract is entered into the proprietor knows exactly, before the work is commenced, what he will have to pay for it. This feature, however, is not peculiar to the system. Before it became customary to supply quantities, contracts were equally definite, and it would be rash to conclude that they were less favourable for the proprietor; on the contrary, the customary allowance for contingencies has now probably been increased, and in most cases the definiteness is only obtained at an extravagant cost; and I say so although I by no means regard it as a thing of little consequence. Now I fear you will consider me to be extravagant when I declare—as I am constrained to do—that I have failed to discover anything else about the London system and peculiar to it which merits commendation. Nor is this unsatisfactory state of matters to be wondered at, because you have made the radical mistake of adhering nominally to a principle which practically you ignore, while you have gradually introduced a practice which, if followed to its legitimate issues, is antagonistic to it; and you have thus insensibly drifted into a false position. Hence naturally the confusion as to the relative responsibilities of parties and the inconsistencies and contradictions of legal opinion on the subject. The root of the evil—and it has many branches—seems to be the illogical, and I think, illegal, repudiation of the responsibilities necessarily associated with the act of supplying quantities. It is clear that logically and in equity the party estimating, not having any voice in the selection of a surveyor, and having no means of testing the accuracy of the documents given him for his guidance by the proprietor through his agent the architect, ought to have recourse against the proprietor if he can prove that he has been either unintentionally or deliberately misled. This you deny, and this denial leads to many objectionable consequences. Traditional usages and prejudices bind you to the old theory that it is the contractor's look-out to see that the quantities are accurate,—although you know perfectly well that in ordinary circumstances it would be absurd to expect him to do anything of the kind, and that in point of fact he takes the accuracy of the quantities for granted either because he has faith in you, or faith in the

* A paper read by JOHN HONEYMAN, F.R.I.B.A., Glasgow, before the Royal Institute of British Architects, May 19th, 1879. (See pp. 565-6.)

These methods, in their simplest form with a parallel treatment, and a variation of round

surveyor, or perhaps because he has faith in the chapter of accidents and cannot have a chance of contracting unless he accepts what you give him for his guidance. As a last resort, you take refuge in this expedient—you declare that you are not, or, that you are not to be held to be, responsible, and you roll the responsibility over upon the surveyor, and tell the contractor to pursue him if he has any cause. Now it is quite right that the surveyor should be responsible for the accuracy of his work, but not to the contractor; for observe the natural result of such an arrangement, the preparation of the bills of quantities and all responsibility connected therewith is virtually handed over to men whose direct interest it is to victimise your client to the greatest possible extent. This is putting it broadly, but that is necessary for illustration; it is still literally true. You will not understand me to impugn the honesty of quantity surveyors as a profession, far from it—indeed my own experience has led me to form the very highest opinion of their probity; but I wish here to bring out clearly the actual relation of the parties and the consequent results. The surveyor and the contractor alone are benefitted by the quantities being excessive; every penny unnecessarily added to the contract price by full measurements is a direct gain to both. The contractor is not even deterred from taking full advantage of such errors by the fear of losing the contract, because he knows that his fellow-offers have all been supplied with the same quantities, while the surveyor being held to be the servant of the contractor, paid by and responsible to him, has obviously most powerful inducements to keep on the safe side with the measurements, to the direct prejudice of the proprietor, who has absolutely no check upon him. This, gentlemen, is the position in which apparently you are quite content to leave your clients. It appears to me that your interference with the contractor has either gone too far or not far enough. In the old-fashioned system of estimating the experience of offerers came into play as a safeguard against excessive cost, but having departed from this, abolished competition as a check on the accuracy of quantities and made the amount of the offer to turn on the mere variety of rates, you take totally different ground, and ought to be prepared for a change of aspect. In the altered circumstances one or other of two things seems to be indispensable—either the absolute accuracy of the bills of quantities must be guaranteed, or some new arrangement must be adopted by which the interests of the proprietor, as well as those of the contractor, shall be secured in spite of inaccuracy in the bills of quantities. Now, the first of these alternatives is hardly practicable, and, as far as I am aware, you have made no attempt to face the second.

It is probable, indeed natural, that the London system and the Edinburgh system, which is not essentially different, should upon the whole work smoothly and satisfactorily. It throws no undue burden upon the architect, the contractor and surveyor have, as we have just seen, good reason to be satisfied with it, while the proprietor, however adversely affected, knows nothing whatever about it, and is content to pay what his architect certifies to be justly due. The absence of friction in the working of such a system is obviously no indication of its harmonious adjustment; and the helplessness of proprietors and their complete dependence upon us for protection ought to appeal very strongly to our sense of duty and encourage us to grapple with the difficulties of the situation.

I must not pursue the subject further under this head, but this is of the less consequence, as I shall have occasion to refer to some other defects and anomalies when treating of the Edinburgh system which is affected by the same vicious principle of undefined or empirical responsibility.

Second.—The Edinburgh system, in so far as it provides for the modification of the contract in accordance with the rates in the schedule, differs from the English system as generally practised, but it affords little (if any) further protection to the proprietor. The question of responsibility is more boldly dealt with, but not more successfully. The measurer expressly states in the schedule that its accuracy is not guaranteed—that is, of course, either by the measurer or the proprietor—and contractors are therefore requested to satisfy themselves on that point, which is simply absurd. Practically the measurers take care to measure the work fully, and the contractor adds a percentage for contingencies and takes his chance of being rightly guided to the cost. Now you will observe that to the extent of this fulness and this

contingency percentage, the proprietor is a loser, he gets no value for either. But these are small matters; there is no effective check on the omission of portions of work which although embraced in the schedule may have been inadvertently left out of the specification, or of works put into the schedule by mistake. Suppose, for example, the measurer inadvertently doubles the number of cubic feet in the stone foundations, the contractor—executing the work to the full intent and meaning of the drawings—would pocket the value of the double quantity of foundations without anybody but himself being a bit the wiser. Here, again, the unfortunate proprietor alone would be the loser, and his case is indeed a hard one; first he pays the measurer, then he pays for everything that is done, and he also pays for everything mentioned in the schedule, even if it has not been done, that is of course assuming that no alteration has been made on the plans and specifications by order of the architect.

It may be said, indeed, that there is every likelihood that errors to the prejudice of the proprietor may be balanced by others in his favour, but granting this—granting that the surveyor is as likely to make a mistake the one way as the other—observe where this doctrine of compensatory errors must lead you. There is a chance of errors being made which shall balance each other, but on the other hand there is hardly any chance that two such errors as I have noted (and it is not an imaginary illustration) shall be made in one bill of quantities, it would say very little for the surveyor if they did, but even the assumption that they may does not relieve you from the difficulty, because while it is quite true that they may balance each other there is at least an equal chance that they are both in favour of the contractor or both in favour of the proprietor. If however you admit, as doubtless you will, that a surveyor only makes such serious mistakes as this occasionally, then it necessarily follows that while his first mistake seriously injures one contractor, his second may as materially benefit another, but the thought that this is likely to be the case can hardly be expected to afford either compensation or comfort to the man who has suffered. A different system is required to protect the contractor in one case and the proprietor in the other from serious wrong; it is a most unscientific procedure to relegate such a function to chance.

But let me illustrate another set of difficulties which the system cannot satisfactorily deal with by an actual case. In a town, which I need not name, two banking companies resolved to erect new offices. They employed the same architect and the sites were contiguous, but in everything connected with the planning and contracting for the buildings they acted independently, so much so indeed that they employed different measurers. It was arranged that the wall separating the two offices should be a mutual or party-wall, but inasmuch as complete plans had to be made for each bank, the party-wall of course had to be shown on each set, and being so shown it was in due course measured by both measurers. Now it so happened that the same contractor got the contracts for both buildings, and it never seems to have occurred to anyone till the work was done, that by his contracts he had exactly twice as much for the party wall as he ought to have had—he had erected both buildings according to the plans and specifications, but he had erected only one party-wall, and was entitled to payment for two. The contractor refused to submit to a reduction on the ground that he had offered to do the work for a lump sum. He also pleaded that for some other portions of the work the quantities stated in the schedule were insufficient. Finally it was agreed that the whole work should be re-measured in accordance with the Glasgow system, under which no such difficulty could have arisen. In this case it will be observed that the final arrangement was facilitated by the architect having in his hands the priced schedules according to the Edinburgh custom.

The remarks I have made on the English and Edinburgh systems evidently point to this conclusion, that both are generally advantageous to contractors at the expense of proprietors, and that this state of matters is tolerated simply because proprietors do not understand the subject, and architects, on whom they rely for protection, have not decided—many have not considered—what measures of reform are desirable, or practicable. Cases in which contractors are the victims do sometimes occur, but they are comparatively rare; because, as a rule, con-

tractors look after their own interests in time; and it may be, as in the case of the Worcester Guildhall (to which I shall further refer), succeed in getting an arrangement made which relieves them but subverts the system. There is no hope for them except by such subversion; and where the systems under review are strictly enforced, most of us have known cases of extreme hardship—as they are called—but which would be more accurately described as cases of gross injustice, in which contractors have been refused payment for work which to the certain knowledge of both the proprietor and architect was not provided for in the estimate, and the value of which was deliberately withheld from the contractor on the plea that he was bound to do the work according to the plans and specifications, without reference to the quantities. In such circumstances the case of the contractor is rendered still more hopeless and helpless if the architect is also the measurer and the sole arbitrator. Such a combination of functions is generally to be deprecated, but it is utterly unjustifiable when there is no remeasurement of the work, and its legality would seem as questionable as its expediency. It seems to me an extraordinary thing that any law court should recognise or respect the pretensions of an individual who claims to be at once the accused and the judge, a party in the arbitration and the sole arbitrator. By a recent decision, however, in the case of *Stevenson versus Watson*, in the Court of Common Pleas, it appears to be ruled that an architect may so act; and that because he must exercise “judgment or opinion” in two of these capacities, he shall be utterly irresponsible for his conduct in the third. That at least is how I understand Lord Coleridge’s judgment in this case: the quantities taken out by the architect and the additions and omissions measured by him may be grossly inaccurate, but because he has to exercise “judgment or opinion” as judge and sole arbitrator in his own cause, the contractor must be debarred from challenging his accuracy, and must be left helplessly at his mercy. Of course in the case in point there may actually be no inaccuracy. I express no opinion on that subject, not having seen the arguments; but the above inference seems to be warranted by the judge’s opinions. I am tempted here to refer to a remark which fell from Mr. Justice Denman. He said: “Ordinary acquaintance with building contracts showed that an architect could not be regarded as a mere easter-up of figures, and ought not, therefore, to be held liable for negligence where a mistake in figures or measurements occurred.” That is a strictly fair and accurate statement of an architect’s position; but it is not a strictly accurate statement of a measurer’s position. The latter is clearly responsible for the accuracy of figures and measurements, and the architect-surveyor cannot escape from this responsibility by the mere assumption of the two-fold duty without great injustice to contractors. In such a case as this of *Stevenson versus Watson*, it may for ever remain doubtful whether the contractor is justly treated or not; but here again, as in my previous illustration, the remeasurement system would clear away all dubiety, and prevent all chance of complications and lawsuits, thus standing out in marked and favourable contrast with the prevailing systems in England and Edinburgh.

The grand obstacle to the satisfactory working of these systems as at present practised seems to be the impossibility of securing either an effective attachment of responsibility or the substantial results of its due recognition. While some legal authorities maintain that the measurer is responsible both to the proprietor and the contractor, others hold that he is responsible to the proprietor only, who is responsible to the contractor. This latter view seems most consistent with the well-known legal principle that one cannot at once “approve and reprobate.” If a proprietor issues a schedule of quantities as a safe guide for a tradesman, from whom he wishes a tender, it seems most consistent both with sound law and sound common sense, that he should bear the consequences of inaccuracies which might prejudice such offerer; otherwise contractors might be systematically swindled with impunity. But at present special agreements in violation both of common sense and law come in to cause confusion and seeming contradiction in legal decisions. Such *ex parte* contentions however can hardly be justified, and at all events it will generally be found in practice that while proprietors are not likely to hear much about

quantities which err by excess, they are sure to find the burden of responsibility for any serious deficiencies by some means or other rolled over upon them. In this connection such a dispute as that which recently arose regarding the contract for the Worcester Guildhall is instructive. In this case, which was reported in the professional journals about six months ago, it is the contractor as usual who discovers that he is aggrieved. He demands a readjustment of the contract on the ground that the quantities supplied to him for his guidance in making a tender were inaccurate, which he is prepared to prove. This seems a most reasonable demand, but he is met with the plea that the bills of quantities were not referred to in the contract. This plea, however, was not maintained and ultimately a new arrangement was made with the contractor; the proprietors no doubt in this case recognising the manifest absurdity of expecting the tradesmen before offering to satisfy themselves as to the accuracy of the quantities. It will always be extremely difficult for proprietors to get rid of the responsibility of their own act in issuing quantities, it ought to be impossible for them to do so; and many cases such as the above prove that in addition to other burdens which the present system lays upon them they may at any time be called upon to submit to a "scientific rectification" of the contract at the instance of the contractor; and this notwithstanding that theoretically they are not responsible. As we have seen, the payment of the surveyor by—although it is really only through—the contractor is held to make him the contractor's servant and so responsible to him. I have already shown how prejudicial this is to the proprietor's interest, but besides that it is not a straightforward arrangement, and, as we should expect, misses its object. The truth is that the full acceptance of this responsibility by surveyors would in most cases be of not the slightest avail either to the proprietor or the contractor, because obviously a guarantee of accuracy is valueless unless the guarantor has adequate means to meet claims which those to whom he is responsible may legally prefer, or rather substantiate. Now I fear both proprietors and contractors would stand a very poor chance of getting two or three thousand pounds—or even two or three hundred pounds—from the average quantity surveyor, however valid their claim; and if so it is clear that this attachment of responsibility is merely fictitious. Some have proposed that architects should be responsible, but under the present system, with which we are at present dealing, architects are not involved unless they think proper to involve themselves by acting as surveyors—a practice which, under present circumstances, is probably as objectionable as if they also acted as masons or joiners, as some "architects and builders" do. Because they necessarily put themselves into this equivocal position: they are liable as any time to be pursued by the contractor, who, theoretically, is their master; and surely a contractor can make an action-at-law a more powerful lever for moving the architect as he pleases than a direct bribe. On the other hand the architect-surveyor alone can discover and expose blunders of his own which prejudice the proprietor who is also his client, and if the exposure of such blunders would involve him in a loss of several hundred pounds I leave you to estimate the chances of such an exposure being made. The position of the architect as the impartial arbiter between the contractor and proprietor is one of sufficient difficulty and delicacy without the interference of such complicated responsibilities, the effects of which, on average human nature at least, must be vicious and demoralising.

Upon the whole, I think it must be conceded that the English and Edinburgh systems are inconsistent with any intelligible theory of the proper relation of parties, and that the practical outcome of both is this:—To the proprietor, unproductive expense, indefinite responsibility, and liability for payment of work which he does not get, but which has been either inadvertently or purposely measured in excess of what the plans and specifications require; to the contractor, great facilities for estimating, for obtaining payment for everything which he does, and for obtaining payment for much which he leaves undone.

(To be concluded.)

The International Telegraphic Congress will open in London on June 10th.

Building Intelligence.

BEARPARK.—On Tuesday the new Bishop of Durham consecrated the Church of St. Edmund, King and Martyr, at Bearpark, near the city of Durham. The style adopted is Early English. The materials used in the construction of the walls are specially made red fire-brick, with white freestone dressings. The accommodation is for 270, and the cost of the structure, independently of the churchyard wall and gates, &c., has amounted to about £2,300. Mr. George Gradon was the contractor for the whole of the works, which have been carried out from the designs and under the superintendence of Mr. C. Hodgson Fowler, F.S.A., Durham.

BRADFORD.—The new chapels erected by the directors of the Undercliffe Cemetery are now completed. The new buildings are erected in the Early English style, the two chapels being similar in design. A handsome *fiche* or turret, rising to the height of 77ft., surmounts the roof, being situate at the intersection of the nave and transepts. Externally and internally the walls are composed throughout of sandstone ashlar from the celebrated Calverley quarries, and each pile is roofed in with the best green slate. Internally the chapels are 46ft. long by 25ft. wide, the mortuary chapels being 26ft. 6in. long by 10ft. wide; and the vestries 10ft. long by 9ft. in width. The height to the ridge of the roof is about 37ft. The windows and glazed work generally have been supplied by Messrs. Camm Bros., of Smethwick, near Birmingham. The aisles of the chapels, also the floors and walls of the mortuary chapels, are laid with coloured tiles of appropriate design, supplied by Messrs. Maw and Co., of Broseley. The contract for the whole has been carried out by Mr. Coates Murgatroyd, of Idle. The designs were furnished by Messrs. W. and R. Mawson, of Bradford; the carrying out of the works having been intrusted to Mr. J. S. Wilson. The cost of the whole will be nearly £8,000.

EDINGTON.—The parish church of St. George, Edington, was reopened by the Bishop of Bath and Wells on Tuesday week, after having been entirely rebuilt. The plans and specifications were prepared by Messrs. Down and Son, of Bridgwater; and the nave has been built by subscriptions at a cost of £1,200, the expense of the chancel being entirely met by Miss Westmacott. The new building is in the Perpendicular style, and comprises a chancel, organ-chamber and vestry combined, nave with bell turret, and transept. The walling is of lias stone, and the copings, arches, and other dressings of Ham-hill stone. The flooring throughout is of encaustic tiling, supplied by Messrs. Maw and Co.; and a new bell has been furnished by Messrs. Warner of Co., of London. The seats are of pitch-pine, and accommodate 250 people. The work has been carried out by Messrs. Merrick and Son, of Glastonbury.

GLASGOW.—Mr. Frank Matcham, Rugby-chambers, Bedford-row, W.C., having been commissioned by the Central Halls Company (Limited) to submit designs for the erection of a new theatre in Sauchiehall-street, has been appointed architect, and the building is now in course of construction. The principal entrance (through the grand hall and staircase) is in Sauchiehall-street, with minor approaches and exits in Renfield and Renfrew-streets. The auditorium consists of orchestra-stalls, pit-stalls, and pit on the ground-floor, with dress-circle and boxes above, and balcony and gallery over all. In addition to these the architect provides spacious crush-rooms, ladies' and gentlemen's retiring rooms, arranged in a most convenient manner, together with smoking-saloon and refreshment buffets in direct communication with all parts of the house, and at the same time kept strictly private. The theatre will be fitted up with all the most modern improvements and comforts (special attention having been paid to insure ventilation), and the whole design has been most carefully considered with respect to providing ample exits for any emergency by a sudden panic.

HALWILL.—The parish church of Halwill, Devon, was reopened on Holy Thursday, after being rebuilt. Formerly the church consisted of simply a nave and chancel, with a tower and porch. This building was raised to the ground,

with the exception of the tower and porch, and the additions comprise a chancel, transepts, and vestry. The church has been rebuilt in the Early English style. The new chancel is built beyond the limits of the old chancel, while the walls of the nave have been rebuilt on the former foundations, and the old windows have been preserved. The dimensions of the edifice in its restored condition are—nave, 38ft. by 16ft.; transepts, 36ft. by 13½ft.; chancel, 19ft. by 14ft.; and vestry, 8ft. by 14ft. The walls are about 14ft. high, and the roof has a 12ft. rise. Local stone has been entirely used for the walls, which are covered on the inside with parian stucco, tinted red. Minton's encaustic and glazed tiles have been used for the floor. The roof is of red deal, oak stained. The seats are of pitch-pine, with oak bench ends. The same pulpit remains, the panels having been restored and new oak piers supplied. The old church accommodated 100 persons, whilst the new building is designed to accommodate 160 people. Mr. Hooper was the architect, and Mr. White the builder.

LEEDS.—A new chapel at Roundhay-road, Leeds, in connection with the United Methodist Free Church, was opened last week. The new church is designed in the Romanesque style. The whole of the outside ashlar work is of Meanwood stone, with Meanwood and Potternstone wallstones. The inside woodwork is of pitch-pine, varnished. The heating is by hot water. The works have been executed by Messrs. Craven and Umpleby, of Leeds, from the designs and under the personal superintendence of the architect, Mr. D. Dodgson, Park-row, Leeds. The church will accommodate 600 persons. In the schoolroom, underneath the chapel, will be accommodation for 250 scholars.

CHIPS.

The parish church of Brailles, which has been under restoration since 1873, will be reopened by the Bishop of Worcester on Friday, the 20th June. On the previous day, June 19th, the new church of SS. Peter and Paul, in the hamlet of Winderton, will be consecrated.

The restoration of Wakefield parish church is steadily progressing. At the present time the south-east window has just been taken in hand by Mr. George Fawcett, the contractor; and the organ is being reconstructed and enlarged by Mr. Arthur Kirkland, of Wakefield.

The members of the West Riding of Yorkshire Finance Committee of Magistrates met on Saturday at Wakefield for the purpose of appointing a deputy-surveyor for the West Riding. The salary is £400 a year, and 143 candidates offered themselves. It was resolved to recommend to the county magistrates at the next quarter sessions to appoint Mr. Joseph Vickers Edwards, aged thirty-one, at present borough surveyor of Burnley. Mr. R. S. Dugdale, deputy borough engineer, of Salford, was second on the selected list.

The parish church of Frampton, Dorset, is being further restored at the expense of Mr. R. B. Sheridan, of Frampton House, by the alteration of the north aisle so as to correspond with the south aisle added seven years since. The work is being done by men on the estate, the carving being done by Mr. Benjamin Grassley, ecclesiastical sculptor, of Dorchester.

The Roman Catholic chapel of SS. Peter and Paul, Mawdesley, near Preston, was reopened on Sunday week, after having been decorated by Mr. R. Park, of Preston. On the high altar has been placed a picture representing the Adoration of the Magi, painted by Mr. Rossi, of London.

Memorial-stones of a new Wesleyan chapel have been laid at the Broadway, Roath, near Cardiff. The chapel will seat 920 persons, and is Gothic in style; it is being constructed of Newbridge stone, with Bath dressings, and the chief façade will be flanked by turrets. A deep gallery will surround three sides of the chapel. The total cost will be £5,500. Mr. Faulkner is the architect.

At last Friday's meeting of the Metropolitan Board of Works drawings submitted by their architect (Mr. Vulliamy) for a new fire-brigade station to be erected in Tooley-street, was approved. The death of Mr. Horace Field, the district surveyor of Putney and Roehampton, having been announced, it was decided to advertise in the usual way inviting candidates for the appointment; the election will take place to-day (Friday) at noon. A formal representation under the Artisans' Dwellings Act, 1875, as to the unhealthy condition of a certain area in Limehouse, was received from Dr. G. A. Rogers, medical officer of health for that parish.

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STONE AND MARBLE. ("E. F." wants to know the addresses of quarryowners from whom he can obtain Hop-ton Wood stone and Derbyshire marble. Any such would do well to make their existence known in the usual manner in these pages.)—ASTI-HUMBURG AND J. ELLIS. (It is, of course, abominable that such people should be allowed to practise a profession of which they have no knowledge; but what is to be done or said while people are so foolish as to employ them?)

Correspondence.

MR. OLIVER AND THE NEWCASTLE FREE LIBRARY.

To the Editor of the BUILDING NEWS.

SIR,—As an outsider, I think Mr. Oliver has not been generously treated by the corporation and its officials in the above matter, and I should not have troubled you, had I not seen that Mr. Fowler has appealed to a wider circle through your columns. For the information of your readers, I trust you will afford me a short space for a brief explanation. In 1875, or about two years before Mr. Fowler came to the town, the corporation proposed erecting a Free Library over the shops and buildings of the vegetable market. This scheme provoked a great amount of opposition, as the site was considered most unsuitable; however, it was contended that another could not be obtained equally advantageous. Things remained in a kind of deadlock until June, 1876, when Mr. Oliver proposed through the Press to amalgamate the Mechanics' Institute and Free Library, and prepared sketches and a perspective to explain his ideas.

Mr. Oliver was thereupon roundly abused by the secretaries and officials of the Mechanics' Institute, and by the supporters of the vegetable-market site; but the conviction at last became general that his suggestion solved the difficulty.

The corporation pocketed the hint, went to Parliament for compulsory powers to purchase, obtained at length a basis of settlement with the trustees of the Mechanics' Institute, and adopted this scheme. About a year after Mr. Oliver had

prepared his sketches, Mr. Fowler was appointed Borough Engineer, and in that capacity had to carry out the building of the Free Library.

With Mr. Oliver's ideas as a basis, our new borough engineer prepared his plans.

Upon a portion of the ground adjoining the Mechanics' Institute stands one of the guard towers of Mediaeval Newcastle.

This tower, which bore the brunt of many a savage onslaught in olden days, and which has been handed down to us in good preservation, is now to be swept away by our spick and span new engineer, who declares it to be a sham and a delusion, and the arched stone of which, he says, is a mere modernism.

This proposed act of vandalism has evoked an opposition ten times more bitter than that called forth by the original proposal to build over the vegetable market. The Press for weeks teemed with protests from every class of townsmen and from many representatives of old county families in both Northumberland and Durham. In public meeting a large majority condemned the outrage, and in the Council an influential and large number of councillors followed suit.

Mr. Oliver, when he built the Mechanics' Institute some years since, left the old Carliol Tower intact, and in his sketches for the free library, still proposed that it should remain. Objecting, as an old townsman, to see the landmarks unnecessarily swept away, he appeared before the Government Commissioner to oppose Mr. Fowler's scheme. His opposition has apparently made Mr. Fowler "exceedingly wrath," and he has, through your columns, rushed into print, and accused Mr. Oliver of making wilfully false statements, and preparing plans to obtain public patronage. Considering that Mr. Oliver has been in practice here for thirty years, that his father before him was for many years an architect and surveyor in the town, that Mr. Oliver prepared his plans for the free library before Mr. Fowler was known or thought of here; and further, that Mr. Oliver's ideas have been adopted without thanks or acknowledgment of any description; one would have thought that Mr. Fowler might have discovered some other motive than deceit and toadyism for Mr. Oliver's public-spirited conduct in this matter.

For myself, and a large number of friends interested in the preservation of the few remnants of old Newcastle still remaining, I beg, through your columns, to offer Mr. Oliver our thanks for his exertions to stay the Vandal's hand.—I am, &c., JOHN STOREY.

Studio, 7, Pilgrim-street, Newcastle-on-Tyne, May 27th, 1879.

CREOSOTING TIMBER.

SIR,—The correspondence on this subject must be very interesting to all connected with engineering works, and is likewise a very important one, and although Mr. Walker would appear to have his doubts about it, railway companies certainly believe in its efficiency; and I notice that the Mersey Docks and Harbour Board are now actually advertising for tenders for 43,000 cubic feet of Baltic red-wood sleepers, to be thoroughly injected with creosote on Bethell's process. Mr. Walker says, in speaking of the timber which failed, the heart was rotten; therefore, to my mind, no creosote had been there, or it could not have rotted; and I should like Mr. Walker to kindly answer me this question:—If, after the vacuum pump had exhausted all the air and sap from the timber, the oil was forced in, what filled the space about the heart? I should like to have Mr. Walker's opinion. The only conclusion I can arrive at is that the timber in question must have been simply immersed in a tank and not properly creosoted at all.

I have been indebted to the BUILDING NEWS for information at various times, and I must acknowledge that I have especially derived much profit by papers published by you, which have been read before the Civil and Mechanical Engineers' Society, and also the Society of Telegraph Engineers. Could not some of the authors of these papers give us their opinions and experience?

I think the jurymen, in the case of this post failing, ought to have taken the opinion of some expert in the creosoting process. When you consider the many thousand pounds spent annually on our railways in preserving these sleepers, it will be seen to be a matter of grave importance to the shareholders.—I am, &c., T. JACKSON.

CREOSOTED TIMBER.

SIR,—Please allow me to ask two questions on the above subject.

1st. Will Mr. Walker state if he noticed any odour of creosote in the decayed portion, because if it had been there once the smell of the creosote oil would be there for ever. Also, what did the broken timber weigh per cubic foot? which would tell us how much oil had been taken up.

2nd. Will Mr. Brain explain how the air and sap are extracted, and why the heart wood does not take up any of the injected oil? As I take it, if there is no creosote at the heart, and the outside is encased with the injected matter, it seems to me it must ferment.

Some years ago you had some able articles in the BUILDING NEWS on preservation of timber; will the author give your readers his opinion?—I am, &c., J. SOMERS.

20, Montpelier-street, Highbury, N.

Intercommunication.

QUESTIONS.

[5779].—**Shores.**—Can any more diligent reader refer me to back numbers in which the theory and practice of raking and other shores has been exhaustively treated? It is a subject which would quite suit Henry Ambrose, but I cannot find that he has touched upon it. Does the rule of thumb alone regulate these important constructions, and, if so, what does it prescribe?—F. JONES.

[5780].—**Concrete.**—I am using concrete composed of the following materials (by measure):—1 of cement, 2 of scientific lime, 15 of broken brick, and 5 of sand. Can any reader say from experience if such a mixture will make a good concrete foundation? The contractor says the cement and scientific lime will not permanently amalgamate, and that the lime will cause the cement to "come again."—G. S. W. J. C.

[5781].—**Acoustics.**—What is the best and most approved modern work on the construction of theatres and lecture halls, especially containing directions relative to sound? Please state name of publisher and price.—ARCHITECT.

[5782].—**Right of Access.**—Attached to A's front wall are certain steps which formerly led to a first floor of C's, the use of both of which is now discontinued. Can C take away the steps and erect something else in their place (A owning the land in front and back)? Does C lose the right of the ground the steps stood upon if he removes them? Can C regain the ground by replacing the steps after an absence of several months?—X. Y.

[5783].—**Purification of Sewage.**—I am extremely obliged to Mr. Jackson for his replies to my queries. Would he now, or any other correspondent, say if the Local Government Board can grant special authority for directly turning a village sewage into the adjoining stream, which is not used for domestic use, or can the local sanitary authority do so by their own authority? I will be much obliged by any information in this matter as the "Tivers Pollution Act" most distinctly prohibits such a proceeding without, so far as I can see, any exceptional or saving rights being mentioned. I may add I know of a district being drained at the present time, and the outfall sewer is directly turned into the village stream. I would like to know on what authority this is being done or can be done. It seems to me absurd to ask a small provincial place of, say, 4,000 inhabitants to construct filters, &c., &c., when irrigation is all but impossible, and, at any rate, very costly. Probably Mr. Jackson will again oblige me.—A LOCAL SERVEYOR.

[5784].—**Discharge of Water.**—What will be the quantity of water discharged per hour from a pipe 20in. diameter and 1,800ft. in length, the head being 250ft. above the delivery? Rule wanted.—PURN.

[5785].—**Building Stone.**—Can any reader give me the name of the stone with which St. George's Church, Birmingham, is faced? A reply will greatly oblige.—J. C.

REPLIES.

[5759].—**Timber Verandah.**—Before "Axiom" writes in the dogmatic way he has done in this matter, he had better look at some examples of oak verandahs. Has he ever erected one? Probably he has not, or he would have discovered that a study of woods can only be made from constructed examples. Let him ask any builder which stands the best in out-of-door work—good red pine timber or oak. No one doubts the strength or durability of sound oak, but that generally used is knotty, apt to warp and split, while the red pine is durable, straight, and can be worked with greater facility.—G. H. G.

[5773].—**Lime.**—Rich limes will, with the addition of water, after having been slaked, become from 3½ to 4 times their original bulk, and when slaked they will hiss and produce hot vapour, and fall to powder instantly. Poor limes do not so much expand in slaking nor by the addition of water, and will otherwise slake as the rich limes, excepting they will require 5 or 6 minutes. Hydraulic limes will set under water in from 4 days to 12 months. Quick lime is lime after it has been burnt in the kiln, and thereby had the acid driven off. It is also called pure lime. Chalk lime is pure lime, and if made into mortar will absorb carbonic acid, and thereby become soft, having a great affinity for water. Poor limes contain no alumina, but insoluble silica. Limes more or less hydraulic contain alumina and soluble silica, and these, as well as the poor limes, expand in setting. The test for a sample of lime will be to slake a little, and add sand and make it into mortar, and fill a very small wooden box with same and put it under the influence of heat, and if it presently shrinks it will not do, as it would shrink on the works. A

good method to adopt is to have lime containing about 10 per cent., of silica. Various tests by muriatic acid, &c., can be applied to ascertain qualities.—HENRY AMAROSE.

[5775.]—**Heating Kiln.**—How would the following method answer? Line the shed throughout with tin as a reflector of heat, and the floor to be rendered a non-absorber of heat by being covered, say, with tin of saw-dust, and then from the lowest level have diminishing tin hot-air pipes fixed at an unvarying inclination of, say, 1ft. in 3ft., and this would carry some right round the building; they might be placed one above the other, several inches apart, and two or three tiers of them, commencing, say, at perhaps 8in. diameter, and diminishing, say, to 3, and their small end at length carried out of the pipe under the roof; and in all cases every precaution must be taken to prevent their getting near any timber in the construction of the building for fear of ignition, and the fire or furnace to heat them must be below the level of the lowest part of pipe in each case, and the most abundant precaution should be exercised to prevent the barest possibility of the flame from the fire entering the hot-air pipes; this may be effected by several divisions of wire gauze, and by dampers and other means, and above all by a proper arrangement generally. I should think a radiating reflective hopper would be the best means to convey the heat into the pipe, but there must also be an efficacious means of supply in abundance of cold air to feed the hopper, or, better still, to feed the fire, taking care that the fire does not also feed the hot-air flue with smoke and flame. The tin pipes could, I think, be so turned at the edges or seams by being beaten together on a mould as to render the dependence on the solder of little importance, and light iron suspension chains might be used to fix them, or light iron brackets if next to the wall, diminishing the sizes of the pipes gradually, which must be accurately calculated and worked to, and if adopted would be likely to cause a very strong draught, and thereby retain the hot air as it passed through the pipe, and when it passed out of the pipe it would then get dispersed in the building. It should be clearly understood that heated air becomes lighter and consequently ascends, and if any dip should exist in a pipe the circulation of the air would most probably stop. The preceding is only suggestive, as I have not tried it nor known it to be tried, but a cheap experiment on a small scale might be made to test its probability of success or otherwise.—HENRY AMAROSE.

[5775.]—**Heating Kiln.**—In answer to "W. and Co.," I can tell them of what I consider the best and cheapest mode of heating their kiln. A friend of mine has one heated by a small tube hot-water apparatus by Hearn & Co., Liverpool; the heat given is 190°, and it dries 2 tons of a material containing 58 per cent. of moisture every twenty-four hours. My friend assures me of its economy and efficiency. The furnace of brick is built below level of drying plate, the fire bars are of piping and are full of water; the pipes run from furnace round the kiln and under the plate. The water is continually being re-heated, and the power of the apparatus is surprising. I have been told that this apparatus will give any temperature up to 550 degrees, and, judging the ease with which my friend gets 190°, I do not doubt but what they can obtain 600°.—J. A. BUCK.

[5777.]—**Drawing Ink.**—T. Drew can obtain the ink mentioned by Mr. Neale by applying to the inventor, Mr. Featherstone, Trumps-green, Virginia Water, not Chertsey, as stated by Mr. Neale.—E. C. P.

LEGAL INTELLIGENCE.

BURNING BALLAST.—A builder named Charles Kellon, of Coleridge-villas, Kilburn, was summoned at the Marylebone Police-court on Tuesday, for burning ballast close to dwelling-houses, contrary to an order of the Willesden Local Board of Health. Medical evidence having been called to show that the practice of burning ballast as the defendant had done was injurious to health, he was ordered to pay seven guineas costs, and obey the injunction of the local board.

ENGINEER'S OR ARCHITECT'S POWER TO DETERMINE CONTRACT.—If High Court of Justice, Chancery Division, May 23. Before the Master of the Rolls. *Kassell v. the Castleford Local Board.* This was an action arising out of the bankruptcy of one of the contractors for the erection of a new market-place at Castleford. Two brothers, John and Thomas Kassell respectively, contracted to do the joinery and bricklaying work, but on May 3rd last John became bankrupt. The terms of contract with the board were that if the engineer to the board on inspecting the works found that they were progressing unsatisfactorily, or at insufficient speed, the board, on giving two days' notice, were to be at liberty to take possession of the works. When John Kassell became bankrupt the engineer inspected the works accordingly, and finding that they were not progressing satisfactorily, reported to a meeting of the board, who adopted a resolution, and gave the contractors notice of their intention to take possession, which was subsequently done. An injunction was now moved for to prevent the board from remaining in possession of the property, and asking that Thomas Kassell might be allowed to continue working, according to the original contract, as he alleged that the delay was no fault of his, but was caused by the brickwork being incomplete, which had prevented his going on. It was also contended that the clause contained the word "contractor," which could not mean all the contractors. His lordship in delivering judgment, said there was really no case at all. The contract was in the usual form of such contracts, by which the builder or contractor was practically at the mercy of the engineer or architect. The words

of the contract were "should it appear to the engineer that the works are not proceeding satisfactorily, or that they are not being executed according to the terms of the specification" the board could then take possession. "Should it appear to the engineer." Therefore, all he had to ascertain was whether the works did appear unsatisfactory to the engineer, and he had no reason for taking into consideration the opinion of other people. The engineer on inspecting the works was dissatisfied with them; and, moreover, reported that they were not "proceeding" at all, and if that opinion was given *bona fide*, and there was no pretence for saying it was not, that would be evidence to the local board of a kind calculated to induce them to take possession of the works. It was not suggested that the engineer was desirous of doing anything but the performance of his duty in the ordinary way, and even if he were wrong, the contract said if it "appeared" to the engineer. His certificate was to this effect: "I beg to call the attention of the board to the fact that the works under contracts 1 and 2 are not progressing satisfactorily, and I ask you to give notice to the contractors, as rendered necessary under the clause." That notice was given, and he should have thought it would have been enough. Then there was a special meeting of the board at which the subject was discussed, and Mr. Wheeler, the engineer, stated that he considered the position of affairs demanded the interposition of the board, and accordingly they passed a resolution, and gave notice of their intention to take possession of the works. Under these circumstances, the engineer having stated his opinion that the works were not progressing favourably, and the board having acted in accordance with his report, he was of opinion that the appellant had no right to ask the Court to make another contract for him. He should refuse the motion, with costs.

Our Office Table.

THE Parkes Museum of Hygiene, temporarily located at University College, of which the Queen is patron, will be opened to the public on and after the 1st of July next. The opening ceremony will take place on Saturday, June 28th, when a meeting will be held in the Botanical Theatre, under the presidency of the Secretary of State for the Home Department. Although the Museum is yet quite in its infancy, it contains a very valuable collection of objects and apparatus relating to every branch of sanitary science. As the only institution of its kind existing in London it will supply a very great want to those in need of facilities for obtaining a practical knowledge of sanitary matters, and professional men, employers of labour, manufacturers, artisans, and other persons, both men and women, will be able to study at their leisure those subjects in connection with sanitary arrangements in which they may be interested, and the benefits of the museum will therefore be extended to all classes of the community. The executive committee—of which Sir William Jenner is chairman—rely on voluntary subscriptions for the support of the new institution under their charge. Of the subscriptions already received they have invested £600 as the nucleus of an endowment fund. In all, something under £1,100 has been subscribed in sums varying from £1 to £50, the latter sum having been given by Her Majesty the Queen. Additional subscriptions are much needed. Manufacturers and others desiring to place articles in the museum will be supplied with the necessary forms on application, by letter, to the curator, Mr. Mark H. Judge, University College, Gower-street, W.C.

THE *Preston Chronicle* tells the following somewhat misty story with reference to the existing masons' strike at Blackburn:—A contractor was said to have sent on Tuesday (in last week) several loads of stone from his quarry to the yard of the Grapes Inn, Northgate, as a gift to the operative masons on strike; but the conditions were that the men should dress the stone and sell it, and spend the proceeds in drink at the Grapes Inn. The men hold their club meetings at this house. Another rumour was that the stone was to be dressed and returned to the sender, when he would pay the men for their work, saying that if they would not go to their work he would send work to them. Whichever of the tales be the correct one, the men set to work about noon and dressed the stone in the yard outside the inn, beer meanwhile being liberally supplied to them. A captain was appointed, and one of the rules laid down amongst

them was that any man who pulled his coat off should be discharged forthwith. Very soon the stone was sold—so, at least, it was stated—and before five o'clock no less than 11 gallons of beer had been served out.

THE dangers of imperfectly-protected glazed well-openings were exemplified at an inquest held on Tuesday week on the body of a maid-servant employed at 200, Queen's-gate, Kensington. On the top floor of this new residence is a landing with a skylight above, and in the floor of this landing are placed three sheets of glass, lighting the staircase and landing below. The glazed surface was surrounded by a rail 8ft. high. A fortnight since the deceased and another servant were throwing towels at each other on the landing, when one fell on the glass; deceased sprang over the railing to get it, the centre sheet of glass gave way, and the girl fell a depth of 60ft. or 70ft. into the hall, the marble slab paving being broken into pieces by the force of the impact. The coroner, Dr. Diplock, remarked that the accident would not have occurred if the glass had been of sufficient thickness; but builders put in inferior material, and the law did not touch them. A correspondent asks whether similar glass flooring is not being placed in other mansions now building in Kensington, and suggests that a low railing placed around opaque glazing is an insufficient guard where young and thoughtless persons have the opportunity of playing on the landings.

THE Turners' Company have announced their intention of again awarding the freedom of the company, silver medals, &c., to the workmen who send in the best specimens of hand-turning in hard or soft woods, stone, iron, steel, brass, or gun-metal. The specimens may be the work either of master, journeyman, or apprentice of the trade in England, and must be delivered at the Mansion House during the week ending October 4, where they will be publicly exhibited on the Tuesday, Wednesday, and Thursday following, the Lord Mayor distributing the prizes on the last day. Lady Burdett-Coutts, who is a member of the company, has given £50 towards the prizes, a like sum to be contributed by the Court of the Company. Bronze medals and certificates of merit will also be awarded.

THE building which once formed St. Andrew's College, Harrow Weald—an institution set on foot by the late Rev. Edward Monro—was, according to the *Guardian*, a few weeks ago put up for sale by auction, after remaining unused, except by casual tenants, since its abandonment some twenty-five years ago. The hall, designed by Hardwicke, and the chapel and library, designed by Butterfield, have been pulled down, and the materials are being used for converting what were the dormitories into a row of cottages. Strange to say, since its abandonment no owner has come forward, and the site is now the property of the village policeman, who took up his abode in a portion of it some fourteen years ago, and now finds himself its owner, under a recent Act of Parliament, by virtue of more than twelve years' undisturbed possession. The stained-glass windows of the library, which were manufactured on the premises by certain of the students, have been preserved for the present, the material being useless for the purpose of cottage construction; a portion of the glass has been purchased by one of the former students, who, in paying a solitary visit last week to Harrow Weald for old association's sake, found the buildings in course of demolition.

WE are informed that the vicar of Arundel, the Rev. George Arbuthnot, left England after the trial for a tour in the East, and it is doubtful when he may receive intelligence of the judgment in the Arundel cause. Any decision as to appealing against that judgment cannot be made until his return. But it is not probable that the risk of further legal proceedings will be incurred unless it appears that substantial help be expected from Churchmen generally towards the prosecution of a suit which involves principles and consequences very far beyond the sphere of the church at Arundel. We think this help, however, would be forthcoming, and we trust it will be invoked. Architects generally have but one opinion about the matter, however their opinions may have been misrepresented by utterances which have been made under Roman Catholic inspiration.

At the twenty-fifth and concluding meeting of the Institution of Civil Engineers, on Tuesday, Mr. Bateman, F.R.S.S., L. and E., the president, stated that during the session just terminated 68 associates had been transferred to the class of members; 60 members and 180 associates, of whom 40 were previously students, had been elected, and 153 students had been admitted. Since the same date last year there had been a net increase of 84 members, 59 associates, 74 students, and 1 honorary member. These several classes now numbered 1,156, 1,829, 598, and 17 respectively—together 3,600, as against 3,382 twelve months ago, being an increase at the rate of $6\frac{1}{2}$ per cent.

The Bradford Art Gallery and Museum was formally opened to the public on Wednesday. The room in which the pictures are exhibited is a very suitable one. The floor of the room is occupied with cases, in which are exhibited a number of artistic objects, articles of curiosity, and specimens of art-pottery, jewellery, &c., contributed by the South Kensington Museum and one or two prominent local tradesmen. There are in all about 300 works exhibited. The work shown have been the choicest examples of many exhibitions, and have been selected from time to time by local art patrons. The works almost entirely belong to the modern English school, and include examples by D. MacIach, Sir Edwin Landseer, J. Pettie, H. Stacy Marks, T. Faed, Clarkson Stanfield, the Linnells, R. Ansdell, Vicat Cole, H. O'Neil, E. M. Ward, J. Sant, L. J. Pott, Alma Tadema, C. W. Cope, S. Prout, J. L. Tissot, R. Beavis, G. Smith, S. L. Fildes, A. Elmore, Erskine Nicol, F. Goodall, J. McWhirter, &c. As regards foreign art, the display is but meagre. Rosa Bonheur is represented by a characteristic cattle piece; Meissonier by one of his studies of the last century; Verboekhoven by one or two of his paintings of sheep; and Duverger by a few incidents of foreign life and sentiment rich in local colour.

The local authorities of Ipswich appear to be singularly unfortunate in their recent building operations. A few weeks since we referred to the serious defects which are revealing themselves in the new town hall, and from the report of the last meeting of the Ipswich School Board we see that that body also is having evidences of bad workmanship brought before them in the schools built about six years ago, under the superintendence and from the designs of their late architect. Mr. Binyon, the present architect to the School Board, reported that at the Trinity-street Schools the water got into the roof through the lead gutters, the lead was not properly turned over nor heavy enough, and did not extend high enough under the slates; the eaves gutter of the cloak-room was blocked; the lead flashing behind the gable wanted retrenching and pointing, as did the ridge cresting, and other repairs were necessary. At other schools in the Wherstead-road the state of the bellcote allowed rain to drive into the infant school-room, the fastenings to the lantern windows and skylights were all defective, and the slates were loose, the latter being due to the fact that wrought-iron nails were used instead of zinc nails, as specified.

CHIPS.

A new flagstaff, erected last week on the tower of Shelton Church, Staffordshire, deserves notice on account of its being, it is said, the largest in England. The pole is the trunk of a Russian larch, 65 feet high, and the flag is 21 feet by 13 feet.

Beacon Crag, a new villa residence at Porthleven, has just been completed from the designs of Mr. J. Trounson, architect, of Penzance.

The Eccles and Barton Local Board have agreed to build a new Town Hall, the cost not to exceed £5,000, exclusive of the furnishing and cost of land. There is to be a public room capable of seating 1,000 persons. The plans are expected to be ready in a month.

The memorial stone of a new Sunday-school, in connection with the Fuller Chapel, Gold-street, Kettering, was laid on Monday week. The chief material used will be red brick, with native iron stone for the plinths of the pillars, Ballingdon bricks for the arches, &c., and red Mansfield bricks for dressings. The total cost is expected to reach £2,600. The architects are Messrs. Joseph Gale and J. Alfred Gotch, Long-lane, Bermondsey; and the contractor, Mr. A. J. Margetts, of Kettering.

New school buildings in connection with St. Cuthbert's Parish Church, Edinburgh, are at present in course of erection. The block has a frontage of 92 feet, and is designed in the old Scotch style. The total cost will be about £2,000. The building has been erected from plans furnished by Messrs. McGibbon and Ross.

The high price realised for 13 freehold houses in the Camberwell-road, at their recent sale by Messrs. Rushworth, Abbott, and Rushworth, on Tuesday, may be of some interest. After considerable competition the property was sold for £17,000, i.e., about 28 years' purchase on the rental, which would pay about $3\frac{1}{2}$ per cent. only.

At Wandsworth Police-court, on Wednesday week, W. Gander, a builder, was fined 40s. and costs for erecting a building without giving proper notice.

The statement that Mr. De Keyser had accepted a tender for building on the vacant ground adjoining the Royal Hotel, Victoria Embankment, is contradicted.

The memorial stones of a new Wesleyan Chapel have been laid at Stechford, a rapidly-growing suburb of Birmingham. The building is of red bricks, and will seat 350 persons. The cost will be £1,500. Mr. George Ingall is the architect, and Mr. William Lee, of Aston, the builder.

The statue of the Right Hon. Sotheron Estcourt, the most prominent feature of the memorial of that gentleman now being erected in the market-place of Devizes, was placed on its pedestal on Monday week. Mr. Nicholls was the sculptor. The basin and drinking-troughs of the fountain are being set in position by the contractor, Mr. Wheeler.

New board schools are about to be erected at Fleetwood, from the designs of Mr. J. A. Seward, of Preston.

From the reply given by the chairman of the City Lands Committee, at the Court of Common Council of the City on Thursday week, it appears that no decision has yet been come to as to the exact spot on which Temple Bar will be re-erected, but the ancient boundary of the City will be marked in some permanent manner.

The memorial stone of a new Baptist Chapel was laid at Newbridge-on-Wye on Thursday, the 22nd. The architect is Mr. H. Thomas, of Cwmtyrch, and the builder Mr. Howells, of Ystradgynale.

The statue of the late Sir John Gray, M.P., which has been executed by Mr. Farrell, R.I.A., was placed on its pedestal at the crossing of Abbey and Lower Sackville-streets, Dublin, on Monday. It is to be formally unveiled on the 24th June.

Towards the close of last year a class of Art and Design was formed in connection with the Literary Institution, Blandford, and about 70 pupils have met in the Freemasons' Hall, under the instruction of Mr. W. E. Brennan. On Wednesday and Thursday last the works executed were publicly exhibited.

The parish church of Gwyddelwern, near Corwen, Merionethshire, is about to be restored, from designs prepared by Mr. Kennedy.

Recently a great many fragments of cinerary urns, such as were used by the Romans for the preservation of the products of cremation, have been discovered at Runham-Vauxhall, near the foot of the suspension-bridge connecting the hamlet with Great Yarmouth; and at the same place, on the 14th inst., a copper coin of Augustus Caesar, upwards of an inch in diameter, and in good preservation, was picked up.

On Saturday afternoon the corner-stone of a new Wesleyan day and Sunday-school was laid at Kersley. The plans have been prepared by Mr. Thomas Ormrod, architect, of Town Hall-square, Bolton, and the work is being carried out under his direction by Mr. Jno. Taylor, joiner and builder, Farnworth. The cost of the building, according to present contract, will be about £970, but the heating, lighting, and furnishing, also boundary walls, outbuildings, drainage, &c., will, it is estimated, bring the total expenditure to upwards of £1,300.

On Tuesday Major Tulloch held a Local Government Board inquiry respecting an application by the Local Board of Cirencester to borrow £1,300 for works of drainage, one object being to relieve the town from floods caused by the overflowing of the Chur. The clerk to the Board and Mr. R. B. Grantham, the engineer, explained the scheme, and mentioned that tenders amounting to £8,047 10s. 10d. had just been accepted from one contractor for the sewerage of the town.

The Northern Lighthouse Board have accepted the tender of Messrs. Morrison for the erection of a lighthouse on Langness, Isle of Man.

The Town Council of Great Yarmouth have had under consideration alternative plans for laying out their land to the north of the workhouse as building sites prepared by Mr. Bly and by the town surveyor, and decided on Tuesday week to adopt the scheme of the latter gentleman.

The death is announced of Mr. Cavell, for many years an alderman and J.P., for Deal. Born in 1804, Mr. Cavell was educated as a civil engineer, and subsequently joined the Royal Engineers. In 1841, he was engaged in superintending the construction of new barracks, an English church and other Government buildings, on Newcastle Mountain, in the island of Jamaica. In 1848 he returned to Dublin, and was appointed surveyor of barracks and overseer of military works, and subsequently was specially selected to superintend the erection of a breakwater at Carrickfergus. He retired from the service in 1858, and has since resided at Deal.

Roofing Felts.—F. Braby & Co.

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FITZROY WORKS, 356 TO 369, EUSTON ROAD, LONDON.
HATTON GARDEN, LIVERPOOL. GREAT CLYDE STREET, GLASGOW. AND AT CYPRUS.

The new line between Cliftonville and Preston, near Brighton, has been completed, and was officially inspected on Friday by Colonel Yolland, of the Board of Trade. The line has been constructed for the London, Brighton, and South Coast Railway Company, by Mr. Firbank, contractor, under the superintendence and from the designs of Mr. Bannister, the Company's engineer.

Five of the metropolitan bridges over the Thames, Lambeth, Vauxhall, Chelsea, Albert, and Battersea, were opened free from toll on Saturday afternoon, by the Prince and Princess of Wales. The Wandsworth, Putney, and Hammersmith bridges remain to be freed.

Piel Bar, at the entrance to Barrow-in-Furness Harbour, has been so far removed, that the channel steamers can now gain access at all states of the tide.

A new endowed school for girls has been opened at Ilminster, and a boys' school is in course of erection opposite this.

Some time since an oak-tree was found under the bed of the river Tone during excavations, and was presented by Alderman Taylor to the Taunton corporation, who resolved to have it made it into a civic chair. The work was entrusted to Mr. Arthur Stevens, of the same town, who has just completed it. The design is Perpendicular Gothic in style, the front part of the chair resting on lions' feet, bearing massive canted and moulded pillars on which stand carved lions supporting shields. The sides are arched, and within them are richly-carved allegorical shields, representing Agriculture and Commerce on one side, and Science and Art on the other. The back is also arched, and rests on columns with carved capitals supported by buttresses, the corporation seal being cut in the centre of the back. The chair is upholstered in olive-green morocco.

The restoration committee appointed by the vestry of Billericay, South Essex, to consider what steps should be taken for restoring the church tower, have adopted the report and suggestions of Mr. J. E. K. Cutts, of Southampton-street, Strand, provided that the work can be carried out so as to preserve the original character of the building. The steeple is a quaint 16th-Century structure of red brick, built into the street-front of a more modern brick chapel of ease; the pinnacles and battlements have long been in a crumbling and dilapidated condition.

The foundation-stone of a new Cistercian monastery was laid at Mount St. Joseph, Roscrea, Connaught, on Thursday se'night, the 22nd inst. The estate comprises 500 Irish acres, and, together with the mansion upon it, has been presented to the community by Count Moore, M.P., at a cost of £10,000. The house is being altered to serve as a guest-house, and the several monastic buildings are to be erected as funds permit. The church now in course of erection will be Early English in style, and will be 210ft. in the length and 60ft. across nave and aisles, both in the clear. Over the southern transept will be a bell-tower; the walls will be of ashlar work, the columns of limestone from Roscommon, and the arches of sandstone. The architect is Mr. W. A. Beardwood, of Manchester, and late of Dublin.

MEETINGS FOR THE ENSUING WEEK.

WEDNESDAY.—British Archeological Association. Papers on "Further Discoveries at Lincoln," by the Rev. J. M. Mayhew; "The Harness Company of the City of London," by C. H. Compton, and "The Course of the Wansleyke, near Bath," by Mr. J. T. Irvine, 8 p.m.

THURSDAY.—Society for the Fine Arts.

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T. W. HELLIWELL, Brighouse, Yorkshire; or, 19, Parliament-street, London.—[ADVT.]

Holloway's Ointment may be relied upon in cases inflammation or irritation of the internal mucous membrane. When it is diligently rubbed upon the Back and Chest, it relieves shortness of breath, fluttering of the heart, stitch in the side, cures colds, asthma, bronchitis, and protects the delicate against consumption.—ADVT.

Trade News.

WAGES MOVEMENT.

OXFORD.—The operative masons of Oxford received six month's notice in November last, of a reduction of wages amounting to 4s. 5d. per week,

with other alterations in the rules. They have addressed a letter to the chairman of the Master Builders' Association, stating that in their opinion the present and immediate future state of the trade in Oxford does not justify the suggested alterations, and requesting an interview.

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TENDERS.

ABINGDON.—For the restoration of the old Council Chamber for the Mayor and Corporation of Abingdon, Berks. Messrs. Morris and Stallwood, architects, Reading:—

Wyatt, G., and Son...	£1,331 11 4
Wheeler, Brothers...	1,300 0 0
Silver, R., and Sons (accepted)...	1,184 0 0

BAONALL HALL ESTATE.—For conversion of existing buildings into five dwellings, for John Keats, Esq. Mr. W. Larnier Sugden, architect. Quantities supplied:—

Grosvenor, J., Tunstall...	£750 0 0
Matthews, Bros., Endon...	737 0 0
Heath, J., Endon...	690 0 0
Nadin, J., Leek...	599 15 0
Green and Hall, Leek...	595 0 0
Leek, W., Hanley (accepted)...	485 0 0
Harding, J., Badley-green...	481 10 0
Bailey, P., (brickwork, &c., only)...	550 0 0
Knight, G., (brickwork, &c., only)...	460 0 0
Casey (plasterer)...	53 0 0
Hudson, Jas. (joinery)...	216 12 0
Hudson, Joseph (joinery)...	199 0 0
Wood, Bros., (joinery)...	169 0 0
Phillips, Edwin (plumbing, &c.)...	58 8 0
Johnson, T. (plumbing)...	50 0 0
Heath, Isaac (plumbing, &c.)...	48 1 0
Stevenson, H. (plumbing, &c.)...	40 0 0

BIRMINGHAM.—For a new church at Nuthurst, near Knowle. Mr. John Cotton, architect, Birmingham. Quantities supplied:—

Brazier and Weaver...	£2,435 0 0
Davies, Brothers...	2,400 0 0
Wilson and Son...	2,390 0 0
Robinson...	2,322 0 0
Smallwood and Co....	2,226 0 0
Partridge...	2,170 0 0
Barnsley and Son (accepted)...	2,123 0 0
Inwood...	2,117 0 0

BRONSCROVE.—For alterations and additions to The Cedars, Blackwell, for Thos. Scott, Esq. Mr. John Cotton, architect, Birmingham. Quantities supplied:—

Mathews...	£1,821 0 0
Smith...	1,694 0 0
Brazier and Weaver (accepted)...	1,526 0 0
Thomas...	1,502 0 0

COLCHESTER.—For alterations and additions to the Essex and Colchester Hospital. Mr. T. H. Wyatt, architect. Quantities by Messrs. George Lansdowne and Harris:—

Dobson, Colchester (reduced estimate), accepted £5,550.

CLAPHAM.—For village club at Clapham, near Bedford, for James Howard, Esq. Mr. John Usher, architect:—

Potter...	£642 0 0
Lilley...	596 0 0
Foster...	576 0 0
Knight and Boston...	560 0 0
Adams...	550 0 0
Freshwater (accepted)...	539 0 0

DULWICH.—For villa residence, Overhill-road. Mr. Richard Peters, architect, Wool Exchange, Coleman-street, E.C.:—

Watson and Dennett (accepted) ... £4,356 0 0

DULWICH.—For alterations to Norse Lodge, Lordship-lane. Mr. Richard Peters, architect, Wool Exchange, Coleman-street, E.C.:—

Burchell... £420 0 0

Watson and Dennett (accepted) ... 330 0 0

DULWICH.—For alterations to Rose Bank stables, by conversion of same into dwelling-house. Mr. Richard Peters, architect, Wool Exchange, Coleman-street, E.C.:—

Watson and Dennett (accepted) ... £1,260 0 0

DULWICH.—For boundary fence, walls, and iron gates and railings, to villa residence. Mr. Richard Peters, architect, Wool Exchange, Coleman-street, E.C.:—

Watson and Dennett (accepted) ... £115 0 0

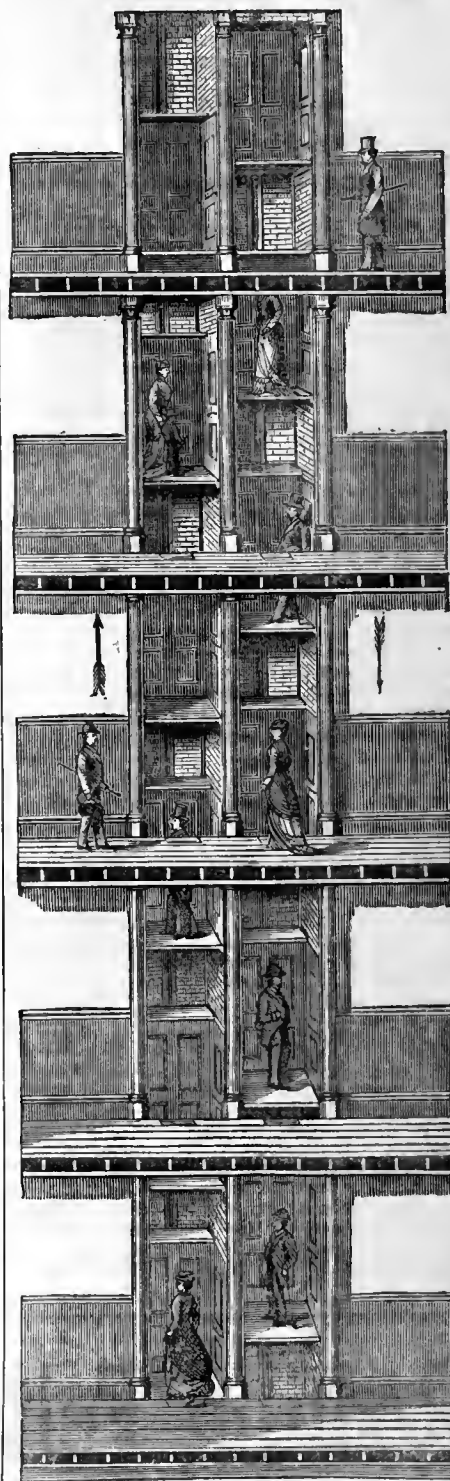
DEPTFORD.—For erecting cart lodges, stables, and disinfecting and destroying apparatus on the Board's premises in Knott-street, Deptford, for the Greenwich District Board of Works:—

Shrimpford...	£3,450 0 0
Scott and Sim...	2,535 0 0
Dover...	2,539 15 0
Hofer...	2,524 0 0
Lord...	2,590 0 0
Tibbitt and Adams, Brockley*...	2,170 0 0

HEREFORDSHIRE.—For the erection of a new vicarage house at Vowchurch. Mr. E. H. Lingen Barker, architect:—

Sandford, J. ...	£2,040 0 0
Welsh, H. ...	1,994 0 0
Coleman, Bros. ...	1,528 0 0
Goodwin, E. ...	1,558 0 0
Rowberry, J. ...	1,545 0 0
Watkins, T. ...	1,499 0 0
Inwood, J. ...	1,486 0 0
Balcombe, W. ...	1,456 0 0
Giles, E. (accepted)...	1,455 0 0

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THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 6, 1879.

ART IN COACH-BUILDING.

AN art presenting some points of relationship to architecture, that of coach-building, can claim as well an historical development nearly as extensive. The Company of Coach Makers, a very important and influential City guild, have held their annual exhibition this year at the Mansion-house, and through the enterprise of the master, Mr. Fredk. Chancellor, architect, and the wardens, the collection of drawings for the prizes possess more than the special interest that would in the ordinary course have been attached to them. The art element has been brought prominently into notice this year, for we have not merely the display of prize drawings of a mechanical and thoroughly technical description that rival the most elaborated geometrical drawings of architects and engineers, but a choice collection of old engravings, photographs, and works illustrative of the art of carriage-building from the earliest times, besides a number of prize drawings for freehand; and it is this feature that has lent to the exhibition a wider and more popular interest. The prizes of the Company are awarded for free-hand or mechanical drawings, and drawings of carriages to the scale of lin. to the foot, and these have been striven for by thirty competitors, among whose work we find a large proportion of excellent draughtmanship. Special prizes have also been given for competition among apprentices and young men under 22 years of age, and it is satisfactory to observe in this contest such really commendable efforts, evincing the value of the new art and technical classes that have been established. A former prize winner, Mr. J. P. Lake, wins the highest prize this year, the silver medal of the Company and £3 for drawings of a four-horse drag and a dress chariot. The report, with a just pride, observes "these drawings show that we have men in England quite competent to produce as good working drawings as those made in France and Russia, if the art is properly taught and encouraged." As mechanical samples showing a high knowledge of technical skill and projection, these drawings are all that can be desired, though the committee are wisely endeavouring to promote a higher art culture. Clever drawings are also exhibited by G. F. Budd, which arrived too late for a prize. For free-hand or mechanical drawing the 1st prize has been awarded to Mr. W. Farr, of Salisbury, a coach-trimmer and a winner of former prizes, for outlines of a pilaster, and some drawings from the antique; we note also a clear, careful drawing of a Greek vase and a scroll by Mr. G. Mundy, of Grantham, who wins the bronze medal. The figure and natural foliage afford excellent subjects for the student in this branch of art, and the ancient and foreign examples brought together show that modern carriage building would not lose by combining artistic with mechanical improvements.

The old drawings and engravings that are exhibited in the apartments at the Mansion House are particularly instructive, and we are glad to find the Company are making an effort to improve the taste of the designer in this department. The series of illustrations from the ancient war-chariot of the Roman or the Briton to the elaborate state carriages of the time of Elizabeth and Charles II., exhibit a continued artistic development; as in furniture, so in this art, structural form and elaborate carving and gilding seem to

have vied in the production of gorgeous, massive, and picturesque carriages, in which the leading artist's skill was sought. In the later style the body of the carriage, with canopied head, was suspended and the wheels richly turned, carved, and ornamented. We see examples of the highly decorated *caretta* or car, the chariottes of later times, the showy, gorgeously carved and gilded state carriages of Louis XIV. and Queen Anne. In the collection of photographs exhibited by the Company and Mr. G. A. Thrupp some particularly fine examples of state carriages are to be seen. We notice, for instance, in the Portuguese series a few superb carriages, with the bodies formed of straight sides, and with elaborate carved and fringed canopies suspended on leather straps; two backs of coaches of Kings Jean IV. and V. of Portugal show a profusion of bold carving of figures and grotesque scroll-work of the most artistic kind, the spokes of the wheels being carved in the most massive yet graceful manner. Another, lent by Mr. Thrupp, shows a coach of King Alphonso VI., about 1656. In one the car is open, sloped outwards at the top, covered by a canopy, and is suspended from a wide carriage of four wheels, all richly carved and gilt; it belongs to the 18th century. If not light or elegant these types are at least artistic, while it is a fact that architects, carvers, and painters of celebrity were employed in their production. We must not overlook a sumptuous coach built in 1713, on the occasion of signing the Peace of Utrecht, for the Duke D'Ossima—it is shown suspended upon leather braces; and a lighter-made one of the time of Louis XV., lent by Mr. Peters, the car of which is suspended, and has a canopied top in three segmental panels. The poles formed a principal feature in these carriages, and the leading-bar of Queen Anne's carriage, together with a piece of the carved and gilt scroll-work, are exhibited. The refined taste of Louis XV. is shown in several drawings; the massive and rectangular forms are changed for graceful curvilinear shapes, and the enrichment, while exceedingly chaste, is less gorgeous and profuse than that of the 17th century. The state carriage built by Godsal, of Long Acre, in 1785, for the coronation of the Queen, exhibits the style of more recent time, of which period several interesting drawings from designs by deceased carriage artists are to be seen. Many old engravings and books show the varied forms of vehicles in the 18th century. We may mention an old print by Vertue, illustrating the procession of charity-school children to St. Paul's upon July 7th, 1713, upon the occasion of a public thanksgiving for peace in Queen Anne's reign; this view shows the style of the carriages, the pages seated in front, and the running footboys, while the houses in the Strand are figured in the background.

The literature of coach-building is represented by a collection of choice books on the craft that occupies the Long Parlour. We open a curious old book, an account of the embassy from James II. to Pope Innocent XI. in 1685, and the state carriage used on the occasion by the Earl of Castlemaine, with its profuse carving, and the massive heavy gilded cars, are peculiarly interesting. Another old book is entitled, "A New Universal System of Inversible Carriages," dedicated by John March to the Prince of Wales. The engravings show designs for coaches with the bodies or cars swung in such a manner from the framework that they cannot be overturned. One postchaise is shown upset, its driver thrown forward, and its wheels completely turned up, while the page is handing out a young lady unhurt. We have only space to say the exhibition is worth a visit by all interested in the craft and by all artists; every conceivable kind of conveyance and style of

harness may be noted, from the earliest curicle, with its sliding bar or yoke, to the postchaise, and from the largest caravan to the latest-fashioned barouche or landau. As regards comfort, light construction, and handiwork, the modern carriage cannot be surpassed, if only a little more art could be bestowed upon it. To this end we welcome the exhibition, and think that much credit is due to Mr. Chancellor for having infused a higher tone into the exhibition, and for having, in conjunction with his committee, popularised the display by the present exhibition at the Mansion House.

APPLIED ORNAMENT.

RESEARCHES into the art of the Greeks and their predecessors, have proved that one great source of effect was obtained by superimposed materials to walls, &c. Thin hammered plates of metal, and inlays, were very common means of producing ornamentation. Müller, Wilkinson, Layard, and other authorities have alluded to the method of enriching sculpture, practised by the Egyptians, Assyrians, and Greeks, and some of the processes described are certainly very ingenious. Plates of gold, ivory, ebony, &c., were used to adorn the statues of the deities, and it is well known Phidias overlaid with ornaments and reliefs of those materials the statue and throne of the Olympian Zeus. In the remains of Greek buildings, as in the Parthenon, several of the surfaces have shown indications of the fixing of metal plates and ornaments, while colour on a species of gesso was by no means an uncommon mode of decorating the Egyptian and Assyrian buildings, as it was of the Greek temples. The Egyptians always applied a fine layer of white stucco or paint over stone, and even the obelisks were also treated in a similar manner. Upon this surface the colours were placed; these were mixed with water, and a little gum. Red, green, and blue were favourite colours. As a groundwork upon which to apply coloured decoration, gesso naturally leads us to ask why it is the modern architect has not done more with his plaster and cement. Stucco ornamentation, such as it was a few years ago, no one could wish to see reproduced, nor can we believe architectural taste will ever degenerate so far as to again bring into use cement architectural features to simulate stone or marble. But we are speaking now of internal stucco as a means of decoration in our walls and ceilings. Paper and various other coverings for walls have of late come into notice. Some of them are excellent; but, after all, no architect can say honestly there is anything to outdo in decorative effect the old plaster work of the 16th century, nor any art that can equal the style introduced in the early part of the 18th century. We may here profitably quote from a recent article in Messrs. Audsley's Dictionary, in which "gesso" is spoken of as a ground for decoration:

"Gesso of a very hard and durable nature was almost invariably used for the applied decorations on statues, columns, mouldings, and any small wall surfaces up to the 15th century, when, as M. Viollet le Duc informs us, a resinous composition was generally employed, which, from the action of heat and cold, has in almost every case peeled off. On this side of the Channel, however, gesso continued in use up to 1420, at which date the tomb of William de Colchester was erected in Westminster Abbey. It was originally decorated throughout with colours and gilding; and the apparel of the alb and the embroideries of the chasuble and maniple were applications in gesso. The modes of treating the gesso applications were uniformly simple, consisting of coatings laid on of a suitable thickness, and impressed with moulds or stamps of wood or metal; or of thin coatings laid upon the surface of the stone or woodwork, to which ornaments of gesso which had been previously prepared in shallow sunk moulds were attached while moist. The former process would produce patterns for the most part below the surface of the coating, the latter designs in relief."

It is known that during the Middle Ages wood mouldings and panels intended to be painted or gilded were often covered by a thin gesso, sometimes laid upon vellum. Messrs. Audsley quote Sir G. G. Scott's "Gleanings from Westminster Abbey," in which Queen Philippa's tomb is described to show that several kinds of application were employed, namely, the alabaster work and the gilt metal wings, besides a profusion of jewels, &c.

With the Romans applied decoration was carried to a great extreme. At Pompeii many fragments of opaque red and amethystine glass have been discovered embedded in the pavement, some combined with marble, and others entirely of glass mosaic. We have in these instances, therefore, something like an apology for the application of surface enrichment to our modern buildings, which architects have not been slow to avail themselves of in recent years. They have unfortunately, however, gone beyond the ancients; they have not stopped where they did, but have brought a rather well-merited rebuke upon themselves—that they merely copied with indiscriminate lavishness where their ancestors brought considerable skill and discernment to the task. If we examine any of the damascened work of the Orientals, we are impressed with a richness that does not oppress by its redundancy; the vases ornamented with metal plates of the Greeks and Egyptians, are even more moderate and tasteful, and these earlier works of the art of overlaying and enriching are as striking in their simplicity as the modern imitations are often coarse and feeble. Sir Gardner Wilkinson mentions the skill of the Egyptians in compounding metals and the methods adopted for varying the composition of bronze; and the vases and implements discovered at Thebes and other parts of Egypt, and seen in the British Museum, afford evidence of their taste in the employment of metal, either in plating or inlaying bronze.

To confine our attention to the Roman period, walls were overlaid with slabs of marble and mosaic, till they reached a degree of richness never surpassed. Works of art were encrusted with marble, gold, ivory, and even gems, and in the church of St. Sophia the incrustation reached its acme of perfection. In Venice the inlays of marbles are abundant, and one of the most pleasing modes of application consists in introducing circular and square panels or bands, with geometrical devices, into the wall-faces—a method to be seen in some of the Palazzi. Messrs. Audsley, in their excellent Dictionary, illustrate one of these from the Palazzo Dario. In London the atmosphere is not kindly to decorative inlays or enrichments of any sort, either externally or internally, as in both cases they suffer from a coating of soot and dust, as we can prove by numerous unsuccessful instances where tiles have been inserted. At the same time there is some hope for a glazed, externally-applied material that shall not deteriorate under an acid-laden atmosphere, and we can point to glazed stoneware, terra-cotta, and glass mosaic, as tried and excellent materials when artistically used.

Before suggesting the right mode of employment, let us consider some of the failures that have taken place in this kind of art. There has been some gross misapplication of materials in this manner. Cement upon brick is one of them. Whoever can look at any of our brick buildings with cement dressings, architraves, friezes, and decorative detail, once so common, without a feeling of disgust? The ground in this case is as precious as the applied cement. If marbles are the applied materials, we almost instinctively feel that the application is justifiable and honest, for then we give prominence to the more valuable; the same may be said of bronze upon stone, and ivory upon

wood. One of the most painful instances of the employment of one material upon another is when the applied material introduced in all the main architectural features is mechanically produced, and we cannot give a better example of our meaning than the terra-cotta inserted in the stock brickwork of the stations on the London, Chatham, and Dover Railway. These segment pointed arches with their coloured bricks and terra-cotta skew-backs and keystones, with a stamped trefoil in them, form a deplorable instance of introducing mechanically produced ornament in such positions. We always feel an interest in a plain, hand-worked brick arch, whether it be a flat-gauged arch in one of our old brick buildings, or an ornamental form of moulded brick; but directly we substitute for the hand-work the machine-made material, all art interest in it vanishes, for we know it can be reproduced *ad infinitum ad nauseam*. A plain plinth mould does not strike us as so glaring an instance of misapplication, and the practice only becomes unpleasing directly we pass the limit of bare utility, and try to save hand-work and skill by machine labour. Take one of our fine old plaster ceilings enriched by the modeller. Is it possible we could feel the pleasure and delight such a ceiling gives us if we knew the panels were ready-made and stuck on like the composition centre flowers to our ceilings? What gives their charm is the fact that they were designed for the ceiling and modelled by the hands of an artist, and that no reproductions of it can be found elsewhere. As soon as our manufacturers will cease keeping large stocks of ready-made designs, and will second the hands of the architect by working with him in the special requirements of certain buildings, the art of wall decoration will again take its place among the accessory arts of architecture.

PERSONAL AND PROFESSIONAL RECOLLECTIONS OF SIR GILBERT SCOTT.*

TRUE enough as it is that "lives of great men all remind us," we may, after some poor fashion at least, follow in the steps their bold strides have stamped more plainly on the path of duty, and hence, in this respect at least, our chief interest is in the record of their work in the world and their character as it knew them, yet we all long to learn more than this about men who are really worth remembering. And when, as happens now and then, one who has gone from us leaves behind him his own account of the early surroundings of a life in which not till long after his fellow-men learned to interest themselves, of the struggles and disappointments which came thickly together before the success of later life, and above all of the reasons for and causes of many actions of the writer which during his life we had puzzled ourselves in vain to account for, and perhaps ignorantly called in question, our interest is more than half mingled with gratitude for the privilege afforded us of a familiarity with the mind and inner life of the author, which few—possibly none—during his life could share. Such an interest is attached in an especial degree to the book before us. Sir Gilbert Scott was not only the foremost architect of his age; he was, as Dean Burgon says in his introduction to this record of Sir Gilbert's life, unquestionably the great art teacher of his generation, and standing in the light of the great art revival which the past forty years has witnessed, we turn with an eagerness unparalleled, except perhaps in the case of Pugin, to discover how in the midst of darkness the first gleams came upon the path of the student, who would then

have looked long around him in vain for any guide, save only the neglected monuments of lost knowledge which it was his after-mission to restore to their former splendour. It is perhaps hardly possible for art students of the present generation, with their ample opportunities of obtaining knowledge, fully to comprehend the enthusiasm and earnest love for English architecture which must have animated the mind of Sir Gilbert Scott at the commencement of his career, but none the less valuable will be the lessons his life affords of tireless industry and integrity of purpose, without which the most shining talents fail to effect much worth doing. Those amongst us who personally knew and valued the great church builder of the nineteenth century apart from his works' sake, will find in this unaffected history of his life much to remind them of the courtesy and simplicity which characterised it, and all will obtain information—and occasionally considerable amusement—from its pages.

The book, we learn from the preface, was designed originally only for the information of Sir Gilbert Scott's family, but as the work progressed its scope became enlarged, and in 1873 its author drew up directions for its publication after his decease, feeling it due to himself "that the statement of his professional life should go before the public in a fair and unprejudiced form; the more so as he had been one of the leading actors in the greatest architectural movement which has occurred since the Classic renaissance." The manuscript naturally enough contained much matter unsuitable for publication, which has been omitted under the editorship of Mr. G. Gilbert Scott, who has performed his work conscientiously and with tact, giving us just as much about his father's purely domestic concerns as the public had a right to know, and withholding nothing of more public and professional interest. The appendices, which contain an account of Sir Gilbert's death and funeral, together with Dean Stanley's sermon, and some papers on the subject of restoration referred to in the work, add completeness to the book, which is suitably introduced by Dean Burgon, except, perhaps, the last few sentences, which relate an incident which we can hardly help thinking might have been kept as private as must have been originally intended.

Sir Gilbert Scott was born at the Parsonage House at Gawcott, near Buckingham, on July 13, 1811. He was descended from the Scotts of Scott's Hall, in Kent, who left Scotland in the 13th century. His mother's family, from whom he derived his second name, were West Indians. His grandfather, the Rev. Thomas Scott, was the well-known Biblical commentator, and his father was the first perpetual curate of a church at Gawcott, which had been built by one John West, a retired lace-buyer, and which after it was built its founder had such great difficulty in getting consecrated that at last he sent word to the Bishop (of Lincoln) that if he would not consecrate the building it should be given to the Dissenters. Even for the time, the church appears to have been as absurdly unnecessary a structure as could be conceived.

"Enclosed between four walls forming a short wide oblong, it had a roof sloping all ways, crowned by a belfry such as one sees over the stables of a country house. The pulpit occupied the middle of the south side, the pews facing it from the north, the east, and the west, and a gallery occupying the north side, in the centre of which were perched the singers and the band of clarionets, bass-voles, &c., by which their performances were accompanied. The font, I well recollect, was a washhand-stand with a white basin!"

The ministry of Sir Gilbert's father appears to have been of an Evangelical type, and although unmarked by anything like cant or pretence, a breach always seems to have existed between him and his clerical neighbours of the "high and dry" type. Not that their orthodoxy had anything in

* Personal and Professional Recollections of the late Sir George Gilbert Scott, R.A. Edited by his son, G. GILBERT SCOTT, F.S.A. London: Sampson Low, Marston, Searle, and Rivington.

common with modern High Church views; they hated enthusiasts and Methodists, especially the latter; one jovial old parson in particular, when led the worse for his cups through the quadrangle of his college, piously exclaimed, "All this I do to purge my college from the stain of Methodism!" Practically, says Sir Gilbert Scott, these men were Pelagians, "hating the Evangelicals, not so much on account of difference of doctrine, but because the latter pressed religion and piety as the chief end of their teaching, while the 'high-and-dry' men did not care or take the trouble to do so, the fact being that they were not religious men." The isolation of the Scott family, consequent on the churlish neglect of their neighbours, was so complete that but for the gentle manners of his parents—especially his mother—and for contact with the pupils taken by his father, Sir Gilbert says, "I cannot conceive to what degree of rusticity we should have fallen." Some of the Gawcott rustics, indeed, seem to have been of a queer race, and the reader will probably chuckle over the humorous sketches of "Mother Warr," "Nanny White," "Cracky Meads," and "Tailor King." Like that of many other country clergymen of limited means, the Scott family was "a large and rapidly increasing one," and the reverend gentleman, having spent all the attention and energy he could spare from his pupils on his two elder sons, Sir Gilbert came off badly. Too poor to send him to school and too busy to teach them himself, his father let him "slip through between wind and water," his one great relief from this life of heedlessness and rough handling being the visit of the drawing-master, a Mr. Jones, of Buckingham, who had studied at the Royal Academy and attracted the favourable notice of Sir Joshua Reynolds, but foolishly returned home to his native village to support himself as a drawing-master and portrait-painter, instead of following up his profession in London. Visits to Stowe, the seat of the Duke of Buckingham, and to Hillesden seem to have awakened a regard for architecture in Sir Gilbert Scott's mind. Stowe was a very fine place, the house having a frontage of 1,000ft., and its owner, the grandfather of the present duke, was afflicted with the traditional land-hunger of the English noble. "He literally," says Sir Gilbert Scott, "came under the woe pronounced upon those 'that lay field to field till there be no place, that they may be placed alone in the earth,' for he nearly ruined the family by purchasing estates with borrowed money, the interest on which exceeded the rental." Hillesden Church was the building which first directed Sir Gilbert Scott's attention to Gothic work. This building, which he restored in later life, was begun in 1493 by the monks of Nulley, and is a very exquisite specimen of this latest phase of Gothic architecture.

"In plan it consists of a nave with aisles and quasi-transsepts, a large chancel with north aisle, a sacristy of two stories at the north-east angle of the chancel aisle, the upper story of which is approached by a very large newel stair at the extreme north-eastern angle. This stair-turret is a very exquisite and striking feature, being finished with a sort of crown of flying buttresses and pinnacles, of which I have seen no other instance, indeed it is one of the most beautifully-designed features I know.* The upper sacristy has a series of radiating loop-holes looking into the church. The walls of the chancel are ornamented by stone panelling. The ceilings throughout had panels of plaster, with wood mouldings. I have since seen some which had unhappily been taken down, and found the plaster to be in thick and very hard slabs, on which were set out curious geometric figures, drawn with the compasses, as if to form the guides for painted decorations. The rood-screen was perfect, and of exquisite beauty. The fittings were nearly all of the original date, and very good,

though, of course, of very late character. The chief exception was the great square pew of the Dentons, a somewhat dignified work of Charles the Second's reign, furnished with great high-backed chairs."

Sir Gilbert Scott's father was so much interested in the church that he urged the Duke of Buckingham to repair it, "the result being that his Grace whitewashed the exterior of the tower!" The churches of Maids Morten, Tingewick, and Chetwood also attracted the attention of the future architect. Of the latter, he says—

"I was never more astonished than when I first saw this church, never having before seen or heard of 'Early English' architecture. It is a fragment of a small monastic church, and its east window consists of five noble lancets, with, externally, plain but bold detail. On either side are fine triplets. Never having before seen such windows, I was greatly perplexed at them, and, failing to get the key, and being reduced to peeping through the keyhole of the west door, I was astonished and puzzled to find that the east windows had shafts with foliated capitals, a thing I had never seen and could not understand. I remember continuing all day in a state of morbid excitement on the subject, and having no access to architectural books, it was very long ere I solved the mystery."

The boy's evident predilection for old churches first led his father to think of making him an architect, and a consultation with his uncle King led to an offer from the latter to take his nephew under his charge and give him some instruction in architecture, of which Mr. King possessed a very fair knowledge. He initiated the young student into Classic architecture. One friend lent a copy of Sir William Chambers' work, another, a portion of Stuart's Athens, and so, says Sir Gilbert, "I was able to follow up architectural drawing, as then taught, pretty systematically, and by the time I was articled I had been already put through my facings to a certain reasonable extent." He thinks he "also had access to Rickman"; anyhow he got to know the ordinary facts as to the different periods of Mediæval architecture. He stayed with his uncle, on and off, about a twelvemonth, during which time his relatives were on the look-out for an architect to whom to article him, and regarding whom "it was a *sine quâ non* that he should be a religious man, and that his terms should be moderate." The profession must have been in a dreadful condition in those days, worse even than now, for Mr. Charles Dudley, a travelling agent to the Bible Society, told Scott's relatives "that there was scarcely a religious architect in London." He at last recommended Mr. Edmeston, better known as a poet than as an architect, and to Mr. Edmeston, accordingly, Gilbert Scott went, at Lady-day, 1827—just about the time his father had managed to collect funds for the rebuilding of his own church, of which job he was his own architect, and regarding which his son remarks, he "cannot say much about design or execution; but these were days to be winked at, as no one knew anything whatever about the subject."

The first remark of Mr. Edmeston, with whom Gilbert Scott now took up his abode at Homerton (his office was at Salvador House, in Bishopsgate-street), was not favourably calculated to induce any strong predilection for Gothic work. Mr. Edmeston declared the cost was so great as to be almost prohibitory. He had once tried it at a Dissenting chapel he had built at Leytonstone, and the very cementing of the exterior amounted to a sum which he named with evident dismay! Few will learn with surprise that his new pupil was disappointed in his master. Sir Gilbert Scott says:—

"I had no idea beforehand of the line of practice followed by my future initiator into the mysteries of my profession; I went to him with a mythic veneration for his supposed skill and for his imaginary works, though without an idea of what they might be. The morning after I was deposited at his house, he invited me to walk out and see some

of his works—when—oh, horrors! the bubble burst, and the fond dream of my youthful imagination was realised in the form of a few second-rate brick houses, with cemented porticoes of two ungainly columns each! I shall never forget the sudden letting down of my aspirations. A somewhat romantic youth, assigned to follow the noble art of architecture for the love he had formed for it from the ancient churches of his neighbourhood, condemned to indulge his taste by building houses at Hackney in the debased style of 1827! I am not sure, however, that I was any very serious loser from this. Mr. Edmeston's practice was a mere blank-sheet as to matters of taste, and left me quite open to indulge in private my old preferences, or to choose in future what course I pleased."

He acknowledges, too, that he learned much in the office of the common routine of building, specifying, &c. which he might have missed in a better one; he found a kind home with Mr. and Mrs. Edmeston, and the years of his pupilage seem to have passed pleasantly enough. During the last of the four through which his articles extended, he took lessons of Mr. Maddox, an architectural drawing-master of great talent, whose tuition appears to have been more congenial than his tenets, for "he was an infidel, and his conversation on such subjects was truly appalling." Among his fellow-pupils here were Edwin Nash, Morton Peto, who had just left Decimus Burton, and Thomas Henry Wyatt. An attack of small-pox, and the grief resulting from the death of his favourite brother Nathaniel, who had also come to London, and who was taken away by brain fever at the early age of sixteen, are related as the only disturbing incidents of this period of Sir Gilbert Scott's life. Towards the end of his articles, Moffatt, who subsequently became his partner, came into his office, and his readiness to acquire knowledge, coupled with his practical familiarity with building construction, won for him the admiration of Scott, upon whom, to a considerable extent, the duty devolved of imparting to him the rudiments of architecture.

The termination of Scott's articles, about Lady-day, 1831, was followed by a month's visit to his uncle King, at Latimers, where he fell in love with his cousin, Carry Oldrid, who afterwards became his wife. A couple of months at home, and a visit to his eldest brother at Goring, were succeeded by a journey to Hull, during which he paid flying visits to Lincoln, Peterborough, York, Selby, and other places of interest. Returning to London, and acting on the advice of Mr. Waller, a well-known surveyor, he placed himself with Messrs. Peto and Grissell, giving such services as he could render, and having in return the run of their workshops and of their London works. The advantages derived during his stay here Sir Gilbert declares to have been considerable, but it did not last long, for it was necessary he should do something for his living, and Mr. Peto did not quite relish his young assistant's prying so closely as he was wont into the foundations of the prices of work and materials. Scott accordingly, some time in 1832, entered the office of Mr. Henry Roberts, who had then recently obtained by competition the appointment of architect to the new Fishmongers' Hall. He was the only clerk in the office at the time, and had the advantage of making all the working drawings for that building, from the foundation to the finish. The engagement lasted two years, during which time Scott got his first drawing hung in the Academy, and ventured into one competition—for a grammar school at Birmingham. The superintendence as clerk of works of a small work at Camberwell concluded his engagement with Mr. Roberts—"a dull, blank period," during which "Smirkism and practical work chilled his own tastes," and he then determined to get into practice on his own account, previously taking three months' holiday, part of the time being spent with his parents at Wappenham, in Northampton-

* Its design was reproduced by Sir Gilbert Scott in the angle turret of the new buildings at King's College, Cambridge.

shire, to which living his father had been preferred by Bishop Kaye, and where he had built a new parsonage-house from a very "ugly design" furnished by his son. About Christmas, 1834, on the advice of his friend Kempthorne, who had been recently engaged by the Chief Commissioner of Works to prepare normal designs for the proposed new unions to be erected under the Poor Law Act, which had then just come into operation, Scott took a set of chambers next to those of the former in Carlton Chambers, Regent-street, and was soon busy helping his friend "on work even more mean than that of my pupilage." This, however, did not last long, for the heavy tidings of his father's sudden death rendered it imperatively necessary for him to take steps to secure his livelihood, since he could look for no more assistance from home. His first course was to send circulars to every friend he could think of begging their patronage; his next to quit Kempthorne, and obtain the appointment of architect to four unions in the district where his father had been known. In a few months, by dint of hard work, he found himself in what was to him a good practice, though for a time unproductive, and involving considerable outlay, in which he was helped by his mother, and by the receipt of his share of a fund which was subscribed as a testimonial and a help to the descendants of the commentator, his grandfather. The next few succeeding years are described as an "era of turmoil, of violent activity and exertion." For weeks he almost lived on horseback, canvassing newly-formed unions. Long coach-journeys and meetings with guardians alternated with periods of close work in his little office at Carlton Chambers, and brief periods of relaxation mainly spent with his mother at Wappenham, where his brother had succeeded his father as rector. Moffatt, who had accepted his invitation to help him with his working drawings, and had been recommended by him to superintend a little circuit of buildings within a few miles of one another, attracted the notice of a Wiltshire magistrate, who used his influence to obtain for him the appointment of architect to the Amesbury Union Workhouse. Moffatt took the appointment, and the drawings were made in Scott's office. Thus was brought about a somewhat anomalous state of things. Scott was architect to four union workhouses in one district, to which Moffatt was clerk of the works; while Moffatt was architect to one in a distant part of the country, the drawings for which were made in Scott's office. This led Moffatt to make a proposal which Scott accepted, and which became the foundation of their subsequent partnership. The effect of the arrangement is described by Sir Gilbert as "magical." Moffatt followed up union-hunting into Devonshire and Cornwall with almost uniform success; and Scott's own poor little quartette of works round his old home soon became as nothing compared with the engagements which flowed in upon the partners.

In 1838 Sir Gilbert married his cousin Caroline Oldrid, and about the end of the year settled down at No. 20 (now 31) Spring-gardens, where their first and second sons were born in 1839 and 1841. From this date Scott's practice began to take a more legitimate and less abnormal line, the pursuit of which we must postpone till next week.

(To be continued.)

BILLS OF QUANTITIES: THEIR PROPER RELATION TO CONTRACTS.*

(Concluded from p. 618.)

THE remaining system to be considered, that practised in Glasgow, shares its favours more equally. By it the proprietor is entirely relieved

from responsibility connected with the quantities; he is called upon to pay only for what he gets, and the contractor gets paid for what he does and nothing more—nothing being referred to in the final measurement except what has been actually done and measured.

This mode of contracting is by no means free from drawbacks, but it is the logical consequence of the interference of the proprietor or his architect with the preparation of the schedule of quantities, and I can see no escape from it. It has many excellent points: for example, it solves the difficult question of responsibility which we have just been considering, and supplies the only substitute for a guarantee of absolute accuracy which has been practically tested. The experience of many years has proved that this substitute is complete and satisfactory, or as nearly so as the circumstances permit. The arrangement is equitable, and it deals impartially with the two parties chiefly interested, which, as we have seen, the other systems do not. Even clerical errors are as likely to benefit the one as the other, and there is always the check of the second measurement *de novo*. The result is, that all cause of quarrel and excuse for complaint is removed, actions connected with contracts are almost unknown, and the system altogether works satisfactorily on this solid and intelligible basis: the mutual convenience and interests of the parties. The defects of the system have recently been the subject of discussion before the Glasgow Architectural Society. They are almost entirely of a kind which would vanish before a little determination and co-operation on the part of architects and measurers; and I have no doubt that some improvements will very soon be introduced. Passing from this, I must notice one objection which is often urged against the system, namely, that it leaves a proprietor in uncertainty as to the cost of a building till it is finished and measured. But this is not so, unless the architect has neglected his duty in the preparation of proper plans and specifications. But if an architect neglects his duty in this respect, the proprietor is not relieved from this uncertainty by any other system, as it is then impossible to foresee the probable extras. If it were otherwise the objection would be fatal to the Glasgow system; but if the experience of a hundred years proves that there is no likelihood of any discrepancy between the estimate and the measurement—that practically there is none, except where it can be clearly traced to the carelessness of the architect or the measurer—then it will be seen that there is little weight in the objection; because if the architect and measurer do their duty there need and there will be no difference between the measurement and the estimate; and if they neglect their duty it is perfectly obvious that, in justice both to the proprietor and the contractor, there ought to be a difference, and the two offenders, or either of them, should at least suffer in their professional reputation.

It can, I think, be proved that with equally explicit plans and specifications there is less chance of the final account exceeding the tender under the system of remeasurement than under any other; and not only so, but (and this is an important set-off against some uncertainty) the work is done at lower rates than if it were not to be remeasured. It is only in localities such as Edinburgh and Glasgow, where contractors are accustomed to both systems, that a comparison in this particular is possible, and there it has been abundantly proved. I have been assured by contractors of high standing and long experience that they invariably charged from 10 to 15 per cent. more for work which was not to be remeasured, besides a considerable sum to cover contingencies; so that, when the work is remeasured, not only does the proprietor pay only for what he gets, but he pays from 10 to 15 per cent. less for it; and this, you will admit, is a very substantial advantage. Another objection which may be fairly urged against the Glasgow system is that it has a tendency to encourage carelessness in the preparation of the documents necessary for obtaining an accurate estimate. Knowing that all will be made right at last, the architect is tempted to pass the plans on to the measurer in an incomplete state, and the measurer to assume quantities which, in consequence of that incompleteness, cannot be exactly ascertained. The undue haste of the architect, it is true, is often the result of undue pressure from the proprietor, who does not realise how necessary ample time is for the preparation of complete working drawings. By resisting this urgency

we may escape the danger on the one side, and by exercising proper authority over the measurer we may escape it on the other. Of defects of a more accidental character I shall mention only two. One is, that the facilities afforded by the system for obtaining estimates encourage young men to undertake work on their own account before they are properly qualified to do so. A man who could not write a specification himself gets an experienced measurer to prepare schedules for him, who thus gives him the benefit of the specifications of others. Another defect is the undue delay which usually occurs in settling accounts. This is caused chiefly by measurers neglecting old work for the sake of securing new: to such an extent is this sometimes carried that I have known premises entirely and satisfactorily finished and occupied for twelve or eighteen months before the tradesman's balances could be ascertained. This, I need hardly say, leads to much inconvenience, and frequently to heavy and undeserved loss, both to contractors and architects. I endeavour to mitigate this abuse by employing several measurers, instead of confining myself to one or two, which would really be much more convenient and agreeable in many respects. But there is no reason why the evil should exist at all; and it might, with other abuses, be entirely swept away, if architects would co-operate and take a more complete control over all the operations of the measurer.

It may, perhaps, occur to some to suggest another objection to the system—namely, that it is impracticable—that it is, in short, impossible to remeasure a large building; but that objection is very easily disposed of. It is not only practicable, but it is constantly done, and buildings of every size and complexity of detail have been measured when finished in Glasgow and neighbourhood during many generations; that question, therefore, need not be discussed. I must now hasten on to consider the last division of my subject.

III. *Proposed Changes.*—What I have already advanced points to these conclusions: First, that the usual practice in contracting is radically defective, being based upon false principles, which are inimical to the essential requirements of any tolerable system—namely, that it should insure justice to both parties to the contract; and, second, that the practice of making the schedule the basis of the contract and remeasuring the work when finished is sound theoretically, and practically efficient. If this be so, it necessarily follows that it is the duty of our profession to make considerable changes in the direction of adopting the good features of the remeasurement system, eliminating the bad, and guarding against its accidental abuses. This involves an entire change in the relation of the bill of quantities to the contract. In short, if we take any cognisance of the quantities at all, we must, in justice to our clients, recognise them to be, along with and quite as much as the plans and specifications, the basis of the contract. I have not said that that course is preferable to our taking no cognisance of quantities at all; but what I do insist upon is, that we must adopt either one alternative or the other—either to have *nothing* to do with quantities, or to have *everything* to do with them; either to allow the quantity-surveyor to be entirely the servant of the contractor, or entirely the servant of the proprietor, and therefore our servant, directly under our guidance and control.

I have thought it advisable to occupy the time at my disposal to-night chiefly in exposing the errors of existing systems, feeling that it was impossible on this occasion both to treat that part of my subject with sufficient detail and also to explain various modifications of the remeasurement system which might be advantageously introduced. Besides, I am sensible that it is vain to talk of the details of reform if I fail to convince you that reform is needed. I cannot indeed believe that the members of the profession generally are content with matters as they stand. Recent discussions of kindred societies; recent articles and correspondence in professional journals; and recent opinions of counsel and actions before our courts of law, all indicate at once the existence of widespread dissatisfaction and its justification. Indeed the time seems rapidly approaching, if it has not already arrived, when we shall be compelled to deal with the whole subject in a liberal and resolute spirit. Meantime, I shall only further trespass on your patience in the hope of extending the scope of the discussion by making, in conclusion, one or two

* A paper read by JOHN HONEYMAN, F.R.I.B.A., Glasgow, before the Royal Institute of British Architects, May 19th, 1879.

additional remarks on the remeasurement system, towards which we seem gradually approaching. An ideal contract would secure for the contractor payment for everything he was required to do at certain prearranged definite rates, or, where these do not apply, at current rates; and, on the other hand, it would secure for the proprietor full and just value for every penny which he was required to pay. Now this ideal is very fairly realised if the work is carefully measured and priced to begin with, and again carefully measured and priced when finished. The whole thing is remarkably simple; there is no mystery or difficulty about it. For the sake of illustration, I submit copies of the estimate and the final measurement of a piece of work which has been actually completed. For convenience, I have selected a very small estimate; but the largest are framed exactly in the same way, and are quite as easily understood. It will be observed that, after deducting half of the measurer's fee, the final account comes to 7s. 7½d. less than the estimate, although it includes two additional chimney cans at 6s. 6d. each, and an extra quantity of felt costing 15s. 2d. For both of these extras the contractor gets paid at the rates contained in his estimate, and he is perfectly satisfied. No question about what ought to be charged can be raised, and if any doubt should arise as to whether the extra cans are on the building or not, that being a matter of fact and not of opinion is very easily settled. All parties have good grounds for satisfaction with such an arrangement; and I may add that there is no difficulty in dealing with every variety of work in the same way. It may be interesting as indicating how successfully such a system disposes of all legal difficulties, and how well it works even with its present defects, if I mention that on taking a hurried retrospect of my own experience since I commenced business on my own account, I find that I have accepted upwards of 1,100 tenders for the principal departments of work connected with buildings, besides innumerable offers for specialities; I have had to cancel contracts, to supersede bad contractors, to get rid of bad contractors and arrange with their creditors without allowing the interests of my clients to suffer, to make deductions from contractors' claims; and, generally, to do all the varieties of disagreeable work usually devolving upon us in connection with such matters; but the lawyers have had nothing whatever to do with these 1,100 contracts, and not one single action at law has emerged in connection with them. A system capable of producing such results would doubtless, if freed from its admitted defects, prove generally acceptable and highly beneficial. In this matter, however, we are helpless, unless we act in unison, and we naturally turn to such a body as this Institute for guidance.

It will be observed that the proposed changes which I recommend are: a radical change in the relation of the bills of quantities to the contract, and subordinate changes which will then be expedient. I shall now only venture to mention one of these. Assuming that the system of remeasuring is generally adopted, it will be found that in some respects the interests of architects will be more directly affected than at present by the conduct of the measurers, and it has occurred to me that many of the minor defects which we find in the working of the system might be removed and the interests of the profession protected, if measurers were not allowed to practise—in other words, if they were not employed by architects—unless they held a certificate of competency from the Institute. This at first sight seems rather a startling proposal; but after a good deal of consideration I believe it to be practicable, and I am certain that, if carried out, it would be beneficial. I may not now expound the many reasons which support this belief, but I may remark generally that, if a change in the mode of estimating is introduced, such as I believe to be necessary to meet fairly the exigencies of the case, it is evident that it will rest entirely with the architects of the country to determine the exact position which the measurers shall hold, and the functions which he shall perform. In the altered circumstances, indeed, architects might with perfect propriety measure their own works, or even make measuring a branch of their business; although I may say that, personally, I regard such a course with strong repugnance. Now, in suggesting such a comprehensive stretch of the Institute's authority, it must not be supposed that I speak merely as a member of the Insti-

tute with an exaggerated idea of its cosmopolitan influence. I know very well how far short it comes of our ideal; but it is nevertheless all we have in the shape of a national professional association, and in such matters of general interest it is bound to assert itself, and to direct and govern the current of reform. Were I not a member, I would be equally solicitous that the Institute should take the matter in hand; and this feeling will, I am sure, be shared by members of the profession throughout the country. It is to be regretted that every one who is duly qualified is not a member. It is needless to point out how immensely such union would strengthen our position as a profession when we come to deal practically with measures such as these, directly affecting us all. I am confident, however, that in introducing changes in our mode of contracting, which may generally be acknowledged to be beneficial, the Institute might safely calculate upon the active and hearty co-operation of all members of the profession throughout the country. Even now the representative character of the Institute, and its value as the only organisation which can efficiently deal with professional difficulties, is more generally recognised than it has ever been before; and I am sanguine enough to believe that that recognition is destined to be progressively more cordial, more universal, and therefore more energetic.

THE FURNISHING OF TOWN HOUSES.

A SUGGESTIVE paper on this subject was read before the Society for the Fine Arts on Thursday evening by Mr. R. W. Edis, F.S.A., in the west gallery of the Architectural Union Company's premises; ladies formed a large proportion of the audience.

That the articles with which we are daily to be surrounded in our homes should be selected for utility and not for show; that ministration to personal comfort and convenience is a quality second only to solid construction and sound workmanship in furniture intended to be constantly used; that it is preferable that our household goods should be made of common, even base materials, well put together, and tastefully decorated, than that we should expend an equal sum of money on others, in which greater intrinsic worth in the substance worked is made a set off against flimsy fashioning and insufficient quantities; that everything in a house should be "fitted for a place, and subordinate for a purpose"; these general rules have, as Mr. Edis apologetically admitted, been deserted upon to triteness. Whatever freshness or interest characterised the lecture lay partly in the way in which these commonplace of furnishing were treated, but more in the detailed modes in which the author proposed to apply these principles to the requirements of these furnishing town houses. The manner in which furniture has followed each change of style, from Greek to Roman, from Gothic to Queen Anne, without being thereby any more closely adapted to the everyday wants, was traced with some tautology and repetition, it being suggested that the only gain in these alterations of fashion is a change of special inappropriateness and particular feature of discomfort. Stress was laid on the point that, if furniture be chosen because it is now in the height of fashion, should it be durable, it will, of necessity, presently look out of date, the obvious moral being deduced that only articles of permanent interest should be purchased, to the avoidance of mere fashionable conceits and passing eccentricities. The higher cultivation of the individual, and as a sequence of the whole community, in the art of furnishing, is not, it was remarked, to be arrived at by setting up any particular style of design, or blindly accepting the dogmas set up by interested persons, but by the inculcation of broader views of the uses and purposes of our furniture, and a consideration of the ways in which the several articles that can be so selected as to form a convenient and harmonious whole. The mode in which the ordinary artwork manufacturer endeavours to foist upon the public his vulgarities, at once clumsy, commonplace, ill-conceived, and costly, under the names of "Old English," "Queen Anne," and "Chippendale" was exposed, but at the same time the author fully recognised the important progress made by some of our leading firms, such as Gillow and Co., Morris and Co., and Collinson and Lock, who have practically spared no pains to produce

the best possible work, and have associated with themselves in the endeavour to provide furniture of good design and workmanship a number of artists of high repute and knowledge. In much of the work of such firms as these, there is evident a regard for harmony of design, as well as for use and suitability, attributable, he thought, in great part to the fact that the designers are not mere preparers of drawings and patterns for chairs, tables, and curtain hangings, but men who, like the artists of the middle ages, believe that every creation of design should be honestly and carefully thought out, whether in the smallest fitting of a house, the commonest colouring of a wall, or the decoration of the smallest panel in a buffet or cabinet, as the most gorgeous edifice, the most exquisite painting, or the most noble piece of sculpture. As an architect he regretted that in these days the designing of furniture has so largely passed into the hands of the upholsterer; and it will be well for art if artists of every class shall think it not derogatory to their rank to conceive and design the lowliest piece of furniture, or the pattern and colouring of wall hangings and floor coverings. A room may be furnished simply and well, usefully, comfortably, and artistically, without of necessity making any enormous outlay. Why should not deal, and other soft woods, he asked, be employed more largely for the construction of such furniture as buffets and panelling, wardrobes and ottomans? Mr. William Burges has shown how artistic ideas can be worked out with the greatest elaboration of colour and ornamental design, and figure decoration, on quite plain surfaces of the softer woods, and the author knew no reason why deal, painted and varnished, should not be largely availed of for much of the internal and subordinate woodwork of our houses. Under the general title of furniture, which properly represented anything movable, he proposed to include all the general fittings which are usually nowadays called fixtures, such as hanging-closets in bedrooms, shelving, built-up buffets, and such ordinary carpenters' work, which, he suggested, may well and economically take the place of the more expensive pieces of furniture, and, he added, that these shelf-clusters or closets need not of necessity become the property of a landlord at the end of a lease; they can all be made separate and distinct, to fit in their various places, and be screwed into blocks or hanging pieces fixed to the walls. For recesses such fittings can be made much more inexpensively than the usual movable furniture, and can be adapted to the general planning of the room. Mr. Edis seemed to have a housemaid's hatred of dust and dirt accumulators, and offered many hints as to modes of obviating the occurrence of dark corners and inaccessible spaces and crevices. On this account all intricate machine carvings, and unnecessary ledges and frettings, were condemned as bad, and traps for filth. Sideboards, buffets, wardrobes, and similar articles of furniture, should either be brought to the floor with a bold plinth or supported on plain, well-turned legs of sufficient height to allow a brush to be used beneath them, and care should be taken that no unnoticed dust-holding receptacles exist on wardrobe-tops just below the ceiling-level. Instead of so accurately fitting the carpet to the contour of the room that it becomes difficult to take it up for cleansing purposes, he suggested that the borders of all floors should be painted, and a few small Persian or Indian carpets laid where most needed for comfort. The machine-made mantelpieces most usually seen in London houses were condemned as commonplace in character, abominable in design, and bad in form, outline, and construction. To leave these as they are would utterly destroy all decorative effect in the room, and he would say, take them down carefully and remove the grates and stoves all away in some cellar, from whence they can be brought to light and refixed when your lease is up. Any new mantelpiece put up in its stead should be fixed as a piece of furniture, removable without damage to the walls. In the dining-room it may be of unpolished wainscot or American walnut, with a lining of black or golden Siena marble, the lower panels filled in with painted subject-tiles or delicate carving of fruit, the main shelf being broad enough to take a clock or other ornaments, with perhaps a centre panel for a portrait or subject picture, enframed in boldly carved moulding. On either side might be plain wainsot panelling carried up to the ceiling line,

or tiers of shelves for bric-à-brac or china, and the top finished with a carved cove, filled in with stamped leather or gilt enrichment. For the drawing-room and library the design of the mantelpiece would require some modification; in the former might be subdued delicate embroidery, painted tiles or Japanese lacquer panels, having recessed shelves, lined with velvet, to set off the vase, china, or glass, the sides formed into groups of shelves or brackets, and the centre filled with a splayed Venetian glass, not at so great a height from the ground as to be rendered useless, and of sufficient size to reflect the works of art in the room. In the library small flanking cupboard may be arranged, with shelves for china or books, so as to carry on the general furniture of the room. If the fireplace can be recessed, this may be lined with decoration tiles in panels, with angle brackets for larger pieces of china or other ornaments. Many persons, it was remarked, do not hesitate to spend from £20 to £100 upon a picture which, while beautiful in itself, cannot give half the delight, pleasure, or variety as half the same sum of money expended upon a really good mantelpiece. In small bed or dressing-rooms for bachelors it was suggested that the mantelpiece may form a sort of dressing-table, having above the shelf and on either side of a large looking-glass cupboards; the mirror could be flanked by light movable brackets for gas or candles; the whole of the woodwork could be of stained and polished deal. In like manner, the lecturer conducted his audience through a London house, "upstairs, and downstairs, and in my lady's chamber," suggesting at every turn some arrangement for providing additional comfort and refinement. In the narrow passage-way dignified in London by the title of the hall, Mr. Edis proposed to place one or two chairs of plain oak or a long deal settle, with plain rail back and elbows, and incorporated with the latter, a small umbrella-stand, having a zine tray at the bottom and a curved brass rail at the top; in the inner hall a simple cupboard, with sliding doors, and containing shelves for coats, and a sliding rack for hats, and hooks or pegs for sticks and umbrellas above; the top may be made of unpainted oak or marble for use as a serving table. On landings a divan or stuffed seat of the plainest description may be placed, and over it may be thrown a piece of coloured stuff or silk, receptacles for plants or flowers being arranged at each end. In the dining-room everything should be as comfortable and convenient as possible, designed for use, not show. The chairs should be broad-seated and backed, the seats and backs stuffed with strong serviceable leather or morocco; he hardly liked to hint at rush bottoms, but he believed these to be as comfortable as leather, and, if made in various colours, pleasant to look at. In addition to these, there ought to be two arm-chairs, of ample dimensions for comfort in carving, &c., and one or two lounge chairs. The most sociable table is a round one about 4ft. 8in. or 5ft. in diameter on one massive central support, expanding into an elongated oval. Nothing shows off flowers and silver better than an ebonised top left open in the centre with good linen slips on the sides for dinner, removed before the wine comes in. Instead of the ordinary sideboard a solid buffet would be preferable, the lower portion being fitted with a collaret and liqueur tray; within a panelled cupboard front on one side and a cupboard and drawers for plate on the other; for convenience in serving the central portion may be made with a sliding hatch communicating with the room behind, or there may be a light lift from the basement. The panels of the doors when sufficiently high to be seen may be filled in with low carving in relief in box or other hard wood, or with marquetry or Japanese lacquers. Panel painting is preferable for decorative purposes to carving, turning, or fret work. Good deal panelling painted of some warm colour, if free from elaborate mouldings, is almost as inexpensive as some of the gorgeous pattern flock papers painted in several tints with which it is considered necessary to make dull and heavy the walls of many a London dining-room. For lighting a central hanging lamp with good shade of subdued or warm-tinted glass is far preferable to any contrivance for burning the filthy compound which the gas companies are content to give to us long-suffering inhabitants. For hangings, there are innumerable varieties of tissues from which to select, and on the walls of the room were hung a number of specimens of coloured damasks, lent by Mr. William Morris. A plain brass rod, or

piece of 1½ in. gas-piping, painted, is ample for curtain-rods. Nothing, the lecturer thought, can be worse than the heavy, lacquered brass or wood poles and unmeaning friezes or valances, which only serve to hide dust, and are execrable in taste. The library should be as comfortable as possible, with broad easy-chairs, low centre-table, with plenty of drawers and pigeon-holes, and a large pedestal-desk, with circular revolving top, to shut up on papers; everything should be arranged for preventing the accumulation of dust, and for this reason the floor ought to be painted all over. The room should be surrounded with bookcases, with sliding-fronted cupboards for periodicals, and drawers for prints and photographs, and all the shelves can be made of plain deal, stained and polished, and fitted at the cornice-level with spring-roller blinds, which can be drawn down at night and fastened with a clip, so as to preserve and protect the books. No set rules can be given for the furnishing of the drawing-room, as that must largely depend on the good taste of the lady of the house. Any, and every, class of decoration and ornament may here be brought together, so long as there is some sort of careless harmony of grouping and colouring. We do not want, he said, our drawing-rooms to be filled with stiff, uncomfortable furniture; nor yet to be museums in which we fear to walk or move about; nor yet showrooms from which the coverings are removed only on grand occasions; but we require pleasant, cheerful rooms in which the collection of furniture and objects of art shall tend to make them more homelike and habitable. By all means have works of all kinds of art surrounding you; but, depend upon it, your enjoyment of them will be materially increased if they are carefully arranged and harmoniously set out. Attention was drawn to a small circular satinwood cabinet of the Adams style, lent for the evening by Messrs. Gillow and Co., which last year was exhibited in the boudoir of the Princess of Wales's pavilion at the Paris Exhibition. The lecturer said he regarded it as one of the most delicate and graceful pieces of modern furniture which he had seen. The panels are of walnut wood, with ebony inlaid, and laid over with box-wood, carved down so as to show the ebony within in exquisite cameo-like medallions after Flaxman; the enrichments and the ornamentations are of gilt lacquer-like character, exquisite in design and beautiful in workmanship. Such articles as these are well suited for the drawing-room, in which everything should be bright and artistic, with general grace and quietness of design, and colouring throughout. As the bedrooms of a London house are, as a rule, sacrificed in height to the reception rooms below, it is desirable to utilise every corner and recess without filling the rooms with heavy and inconvenient furniture. The recesses formed by the fireplaces should, in part at least, be filled with hanging closets, which can be screwed to the walls and removed at will, carried quite up to the ceiling; the whole may be fitted with shelves, hooks and rails, and sliding shelves, and drawers, and enclosed with folding-doors in two heights, the lower panels being filled with plate glass. In the dressing-table might be nests of drawers on either side of a cupboard in the lower portion. If any panels in the room are decorated at all, let it be done with some pleasant drawing in monochrome or diaper enrichment; which shall not suggest spottiness and crudeness to those who have to lie long hours and look at them. He could not agree with the fashion which is endeavouring to revive the heavy wood bedsteads of our ancestors; nothing can be better or more cleanly than painted iron or brass bedsteads with light hangings, cheerful yet subdued in colour. A variety of patterns of printed cottons and cotton tapestries, lent by Messrs. Morris and Co., were exhibited, and should these be too sombre in tone, the lecturer suggested that Indian printed cottons, commonly called "sambars," should be procured, or some of the Indian silks with cotton backs, which can be bought for something less than 2s. a yard; specimens of these, lent by Mr. Graham, were referred to. One suggestion made by Mr. Edis, which would appear to need a good deal of consideration on sanitary grounds prior to application in any instance, was that if it be possible to get waste-pipes away so as to empty free into the open air, and not attached in any way to the drains, instead of the ordinary washhand-stand with fittings of porcelain or earthenware so liable to breaks and damage, one

of the common tip-up basins should be introduced, fitted in a suitable frame, and with water laid on from the nearest cistern. This Mr. Edis regarded as infinitely more convenient and serviceable in all ways, and it would certainly, as he pointed out, save the domestic drudge a considerable amount of labour. In conclusion, the lecturer insisted on the point that the aim of all true art in furniture, as in everything else, should be to produce good work for the million, so that at a moderate cost things beautiful in design, detail, and colour may be brought into everyday use.

DOCK GATES.

AT the last meeting of the session of the Institution of Civil Engineers, held on the 27th of May, a paper was read on "Dock Gates," by Mr. A. F. Blandy, M. Inst. C.E.

The author commenced by defining the general features of a pair of gates and their surroundings, then passed on to the strains to which a gate was subject, and gave a formula for the pressure per unit of length. Examining the mutual action of the gates on each other, he stated that in practice this was liable to vary, and that three cases must be considered:—First, the gates might be constructed so that when under pressure the meeting faces of the mitre-posts bore fair and true against each other, and distributed the mutual reactions uniformly throughout the width of the meeting faces. Secondly, foreign substances, such as chips of wood, might intrude, or the gates might wear and become a little too short, causing them to nip on the dock, or inner edges of the meeting faces. Thirdly, the gates might be a little too long, in which case they would nip on the outer edges of the meeting faces.

The magnitude and direction of the primary forces acting on the pair of gates were next investigated, and it was shown that a point could be found on the centre line of entrance, the distance of which from any point on the back of the gate was proportional in magnitude to the resultant of all the forces acting on a section taken through the gate at the point measured to. It was also shown that, in practice, the line of position of these resultant forces in most cases corresponded with the arc of a circle drawn through the centre of the heel-posts and of the meeting faces of the mitre-posts. The effect of nipping would be to transfer this arc from the centre to the edge of the meeting face at which nipping occurred, and consequently to proportionately increase or diminish the bending moments on the gate.

The effect of direct compressive stress combined with bending moment when applied to various forms of structure, such as were common in dock gates, was then examined, and methods of finding the intensities and distribution of stress at a cross section by means of diagrams were described for three different forms of wooden gates, viz.: 1st. When the gate was formed of rectangular wooden beams. 2nd. When it was built in divisions corresponding to the voussoirs of an arch, and depended entirely on the arch-form for its stability; and 3rd. When the gate was built in divisions as in the second form, but of less curvature, and required the assistance of the supplementary connecting pieces, which must be taken into account when computing the strength.

Looking at the general features of the last-mentioned gate, the first impression was to regard it as a form of bowstring girder, but further consideration would show that this could not be, as there was nothing to transmit the longitudinal stresses from the "bow" to the "string," the transverse bolts being obviously insufficient for that purpose. When, however, the action of a bending moment caused the gate to deflect, the transverse bolts, though allowing the voussoirs and connecting pieces to slide on each other longitudinally, would maintain them laterally in their relative positions; consequently they would bend through similar angles, and the total moment of resistance would be the sum of the amount of resistance due to the voussoir plus the moment of resistance due to the connecting pieces.

In the case of trussed beams, the effect of direct compressive stress combined with the bending moment had to be considered, when applied to a rectangular wooden beam supplemented by wrought-iron truss rods. To illustrate this the simplest form of truss might be taken, namely, that consisting of a rectangular wooden beam supplemented by two wrought-iron truss rods

and a king-post, and it might be assumed that the king-post was inelastic and of infinite strength. It would occur to the observer, that the stresses on the different parts of such a system might vary indefinitely, according to the method of attaching the rods to the beam and also to the extent of initial stress put upon the rods before the system was subjected to extraneous pressure. Certain conditions must therefore be assumed before an investigation of the stresses on the different parts could be attempted. If strength only was considered, the best adjustment appeared to be that which, when the system was under pressure, caused the whole bending moment to be borne by the truss rods, and left the timber over the king-posts entirely free from transverse strain.

Formulae for the stresses on the various parts were then given, and it was demonstrated that if the truss were cambered or allowed to sag, then the stresses would be increased, and the best condition of adjustment was the one first assumed. To attain this condition, if the beam was continuous from end to end, the system when under pressure must have a certain deflection, viz., one-fifth of that which the beam would have if there was no system of trussing. The condition of the system when the pressure was removed was next examined, and formulae were given for ascertaining the camber which it would assume. The intensities of stress on the various parts were also investigated, formulae for the same being given, together with methods of showing those intensities by diagrams. A similar analysis was also made supposing that no working deflection was allowed.

In the case of wrought-iron gates, the point to be considered was the effect of direct compressive stress combined with bending moment on a wrought-iron girder composed of flanges connected by a centre web. The position of the neutral axis was investigated, and methods by diagrams were described; first, for finding the intensities and distribution of stress on any given section; and secondly, for designing a section of such proportions that the intensity of stress on any fibre should not exceed certain limiting intensities of tension and compression. When the method of finding the principal stresses, as explained, was considered in connection with the effect of a bending moment, there could be no doubt but that, theoretically at least, the most advantageous form was that on which the water-pressure produced no bending moment, that was to say when the line of the centres of gravity of the cross sections corresponded with the centre line of the gate, and when the centre line of both gates formed together one continuous arc of a circle extending from centre to centre of the heel-posts, and passing through the centre of the meeting faces of the mitre-posts. The author showed that when this form was departed from the increase of metal would be as rapid as the gate was flattened, nor would any appreciable reduction in the cost per ton occur, until the gate was reduced to the absolutely straight form, when the increase of metal would, in the author's opinion, more than counterbalance the decrease in price supposed to arise from the use of unbent plates.

As regarded the rise, Mr. Bramwell had pointed out that the most economical form of gate was that in which a pair of gates when shut formed a continuous arc subtending an angle of $133^{\circ} 56'$, at the centre of the circle of which the said arc formed a part, thus making the rise of the gates equal to the width, from centre to centre of the heel-posts, multiplied by 0.32958; or in round figures, when the rise was equal to one-third the span.

Hitherto no notice had been taken of the variations of stress due to the alteration of form when under pressure. Any analysis of such variations must necessarily be complicated; and it appeared to the author that it would be useless to attempt to arrive at any general form for such investigation, as every gate would have its own individual peculiarities, which would inevitably vitiate the result. Practically, if the strength of a gate was calculated on the bases of the extreme cases of nipping at the inner and outer edges of the mitre-post, the increased stresses due to alteration of form under pressure might be safely ignored. Setting aside theory, it must be remembered that the most economical was not necessarily the most advisable form for a pair of dock gates. The gate was the most important part of a dock, but it was a comparatively small item of the cost, and its outlines should be designed with a view to the general convenience

and requirements of the situation, rather than to the structural economy of the gate itself.

The paper was accompanied by four appendices. The first appendix gave a method of dividing the vertical section of a gate into layers sustaining equal pressure. The second was a proof of one of the investigations in the paper. The third gave an example showing the practical application of the method of ascertaining the stresses on a dock gate; and the fourth treated of the deflection of wooden beams of uniform rectangular section throughout their length, and showed how the deflection could be deduced from the curve of bending moments.

THE BATH AND WEST OF ENGLAND SOCIETY'S EXHIBITION AT EXETER.

ESTABLISHED IN 1777 at Bath, this society's annual exhibitions held high prestige in the western and midland counties. The show for 1879 has just been held at Exeter, opening upon the 2nd, and closing this day (the 6th inst.) The weather was most unpropitious; but notwithstanding the vagaries of the elements, the ancient city has been thronged throughout the week with visitors. The streets have been bedecked most gaily with arches and flags, and illuminations have taken place every night. The exhibition itself was held upon grounds adjoining the Topsham-road Barracks, a space some 600 yards by 300 yards being inclosed by boardings. Within this were some 40 or 50 sheds. The fine-art display has exceeded, perhaps, in merit, the displays of past years. The principal loan contributors were Sir Stafford Northcote, Sir Thomas Ackland, Lady Morley, Lady Rolle, Sir John W. Walrond, &c., and some of the pictures shown were very fine. There were three valuable examples of Gainsborough—a portrait of Mrs. Cleveland, wife of John Cleveland, Esq., M.P. for Barnstable in seven successive Parliaments; a portrait of Richard Stevens, Esq., of Winscott, Sheriff of Devon in 1737; and the third is a portrait of David Garrick. Mr. J. C. Moore-Stevens has in a case close by, in reference to these pictures, three letters of Gainsborough's. One is written from "Circus, Bath, Sept. 13, 1767"; another is dated, "Bath, Jan. 28, 1768"; and a postscript is added to the third, dated Oct. 2, 1767: "P.S.—Packing case cost me 7 shillings, which my wife desires me always to remember, and I often forget voluntarily, because I am ashamed to mention it." There was a masterly portrait of "James Northcote, R.A.," by himself.

Amongst the water-colours were a series of clever sketches from Brittany, Normandy, and the Rhine, by Mr. R. Medley Fulford, architect. There was also an interesting collection of old china, Bow, Chelsea, Derby, Worcester, Bristol, Swansea, and Wedgwood ware; and some rare and curious old Liverpool painted tiles. The display of lace was excellent, Miss C. B. Cossins, of Broadgate, Exeter, made a good show of charming specimens of Honiton lace, and a woman working at the "pillow" by her side illustrated pleasantly how this much-prized (and priced) material is manipulated. But the richest collection in this class was shown by Messrs. Tucker and Sons, of High-street, Exeter, who, in a small case of Sage's, Gray's-inn-lane, having a frontage of 6ft. by 5ft., contrived to exhibit nearly £2,000 worth of this delicate fabric. Small Point Gaze collars at five and six guineas apiece; pocket-handkerchiefs at fourteen guineas apiece; and "flouncies" of the same material at 58, 150, and 180 guineas each respectively, suggested seriously to the very much married man of the period that fair women sometimes put more than the yearly stipend of a curate upon the very hem of their garments. Mr. Harry Hems, of Exeter, exhibited a number of examples of his church furniture and carved work, amongst them an eagle lectern designed by Messrs. Innocent and Brown, of Sheffield; and there was a good show, principally by local cabinetmakers, of so-called "Early English," or "14th-century" cabinets—their style really being a free treatment of Jacobean work. Messrs. W. Easton and Son, granite merchants, &c., of Exeter, showed a comprehensive collection of geological polished specimens illustrative of the marbles and granites of Devon, and worked blocks of their Haytor, Moreton, Hampstead, and Dartmoor granites. They also showed a good grooved granite roller clod-crusher. Messrs. Candy and Co., of Cludleigh-road,

Newton Abbot, had samples of their excellent tiles, bricks, and Doulton ware; and Mr. John Matthews, of Weston-super-Mare, showed good specimens of what his warm and red clay was capable of doing in the way of vases, stands, drain-pipes, &c., &c. What may be done in the way of improved greenhouses was pleasantly illustrated by erections upon the grounds by Messrs. Cranston and Luck, of Highgate-street, Birmingham, and others.

In wood-working machinery the largest show was made by Mr. F. W. Reynolds and Co., of Southwark-street, S.E. This energetic firm had 29 band and circular saws working upon the ground, and their new mortising, boring, core-driving, and tenoning machine received special attention from those interested in the building trade. Great complaints were made generally of the traction-engines being allowed to come upon the ground up to the very last moment, tearing up the turf and helping to make the mud altogether dreadful.

LIGHTNING CONDUCTORS.

IN some recent accounts of damage done to the church of Laughton-en-le-Morthen, it was stated to be protected by a lightning conductor. From the description of the damage done to the building, Mr. R. S. Newall came to the conclusion that there was no efficient conductor, so he had it examined, and the following is the result:—The spire is 175ft. in height, and it had attached to it a thin tube, made of corrugated copper, about seven-eighths of an inch in external diameter and five-eighths internal. The copper is about 1-32nd of an inch in thickness, and it weighs about 1½lb. per yard. It is made in short lengths, joined together by screws and coupling pieces, but there is no metallic contact whatever between the pieces, which are much corroded. The conductor appeared to be fastened to the vane. It was not in contact with the building, which it ought to have been, but it was kept at a distance of about 2½in. from it by 21 insulators. The earth contact was obtained by bending the tube and burying it in the ground at a depth of from 6in. to 18in., the soil being dry loose rubbish; the length of the earth end was only 3ft., with two short pieces of about a foot in length, each tied to the tube by thin wires, thus forming altogether a most inefficient conductor. It was placed in a corner formed by a double stone buttress, which came between the conductor and a lead-covered roof attached to the spire, the distance between the conductor and the lead roof being about 6ft. 6in. The lightning appears to have come down the conductor a certain distance, and, finding the road to earth bad, it passed through a buttress, dislodging about two cart-loads of stone, and then came down the cast-iron down pipes, leading from the lead-covered roof, and so to earth. Now if the conductor had been made of copper-wire rope, weighing about 2lb. per yard, and fixed in contact with the spire, without insulators and with a proper earth contact, no damage whatever would have been sustained by the building; and if the conductor had been tested periodically by an expert he would have shown whether the conductor was good or useless. This examination ought to be insisted on, as the earth connection is often wilfully destroyed; but Mr. Newall states he has never in all his experience known a building which had a conductor properly fixed to suffer damage from lightning.

The Chapel of Ease of St. John, at Needham Market, Suffolk, which is practically the parish church of that town of 1,500 inhabitants, was closed at short notice on the Sunday after Ascension, the architect who had been consulted, Mr. J. H. Hakewill, having certified that the roof is so unsafe that it may suddenly fall. A meeting was held to consider the matter on Friday last, when it was reported by Mr. Hakewill, that some of the roof timbers are broken and others rotten, and although the walls are sound, lining after lining has been added to the roof, till its weight would drive out the stoutest nail. Behind the ceiling it has been found is a handsome timber roof of 15th Century date, almost unique in construction and beauty, and the question came up whether this should be restored or a simple plain roof erected at small cost. After discussion it was resolved to carry out the scheme of restoration as originally proposed in its entirety, and in sections, the roof being first, the seating second, the bellcot third, then the porch, and lastly, the external walls and windows.

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PROPOSED RECASTING OF CHURCH OF ST. MARY, WOOLWICH.—DETAILS OF NEW CATHEDRAL AT MELBOURNE.—DESIGN FOR A COUNTRY HOUSE.—ORNAMENT FROM AMIENS AND SALISBURY CATHEDRALS.—CLAREMONT BUILDINGS, HASTINGS.

OUR LITHOGRAPHIC ILLUSTRATIONS

CHURCH OF ST. MARY, WOOLWICH.

It is proposed to remodel this unsightly structure by replacing the present flat entablature and low ceiling, with an arcade, supporting a "barrel" roof, adding greatly to the height of the church. A chancel, with an apsidal end, is intended in lieu of the existing shallow recess for the Communion-table. The interior is designed to be coloured throughout. An open belfry is proposed, in place of the present ugly cornice and parapet. The architects are Mr. E. F. C. Clarke and Mr. George Wood, of 10, Serjeant's-inn, Fleet-street.

NEW CATHEDRAL, MELBOURNE.

On May 16th we illustrated in full the several elevations with plan of this important building, which is about to be erected at Melbourne, from the designs of Mr. W. Butterfield, architect. To-day, in obedience to our promise, we publish longitudinal and other sections, rendering our series of illustrations of the design thoroughly complete. The characteristic refinement of the design and purity of its detail is well worthy of the reputation of the eminent architect who is the author of the design.

DESIGN FOR A COUNTRY HOUSE.

The accompanying drawing illustrates a country house designed by Mr. J. D. Sedding. The style employed in the design is that of the 16th Century, and it is intended to be built partly of red brick and partly of wood and plaster work.

ORNAMENT FROM AMIENS AND SALISBURY CATHEDRALS.

The Royal Architectural Museum Sketching Club held its monthly meeting at Westminster, on Wednesday last, the members assembling more numerous than on any previous occasion since the commencement. Mr. Ewan Christian was to have been the visitor on the occasion, but was unavoidably prevented from attending. Several sketches of much merit were brought together, and mutual criticisms made. To-day we publish one of the drawings submitted at a recent meeting, by Mr. J. Frederick Pennington. The sheet illustrates to scale some very interesting ornament from Amiens and Salisbury Cathedrals of Late character. On Saturday, the 14th inst., the first of a short series of Saturday

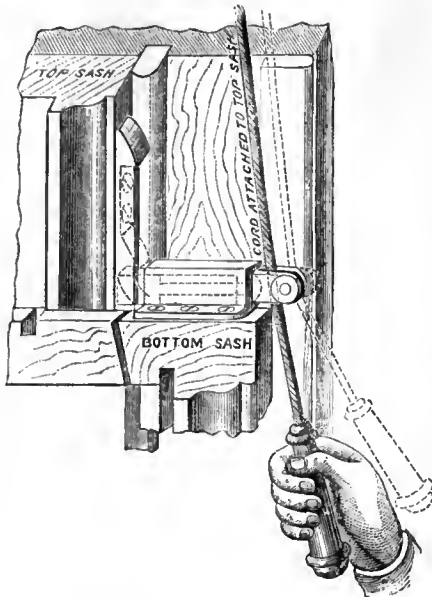
afternoon sketching excursions, arranged for members of the club, will take place under the direction of Mr. Maurice B. Adams, to Stone Church, Kent, where the rector, Canon Murray, has kindly promised to meet the party. Mr. Randall Druce, curator to the museum, is the hon. sec. of the Sketching Club, from whom particulars may be obtained.

CLAREMONT BUILDINGS, HASTINGS.

THE above buildings have been erected at the sole cost of Thomas Brassey, Esq., M.P., for the benefit of the town of Hastings and St. Leonards. The top floor consists of a series of well-lighted rooms, and are used exclusively by the School of Art and Science. The second floor contains studios, and a suite of apartments for Mr. Brassey's accommodation. The first floor is used for public meetings and exhibits of paintings, &c. The ground floor is fitted as a library and mechanics' institute. The basement is used by the Hastings Rowing Club, both for club purposes and the stowage of boats, living-rooms being also provided for the housekeeper. Mr. W. L. Vernon is the architect.

EDWARDS'S VENTILATOR AND SASH FASTENER.

ONE of the cheapest, most easily managed, and effective sash fasteners we have seen is that invented by Mr. G. Edwards, of Brompton-road, the principle of which will readily be understood from the sketch. By pulling two handles the fastener is unlocked and the top sash lowered; by pulling two others the window is at once closed and locked so that it is impossible to open it from the outside. The sash can remain open at any height, so that any desired amount of air can be admitted. The fastener can be easily applied to any window with a sliding sash, it does not interfere with the action of Venetian or other blinds, it is self-acting in so far that the window locks itself when wholly or partially closed, and both sashes are closed simultaneously; it is also unlocked and opened at the same time. The best proofs of its security against burglars and breakage of the window-glass are that the Metropolitan Police recommend it as the best protection for windows, and that plate-glass windows fitted with the fastener are insured at a considerably reduced premium.



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THE DECORATION OF ST. PAUL'S.

THE attention of the artistic community in Florence has been called to a proposed contribution towards the solution of the problem how to complete St. Paul's Cathedral, in the shape of a suggestive design for the decoration of the interior of the dome, the joint work of Charles Heath Wilson and R. Popplewell Pullan, the well-known architect. Messrs. Pullan and Wilson have for many years, each in his own way, made a special study of archi-

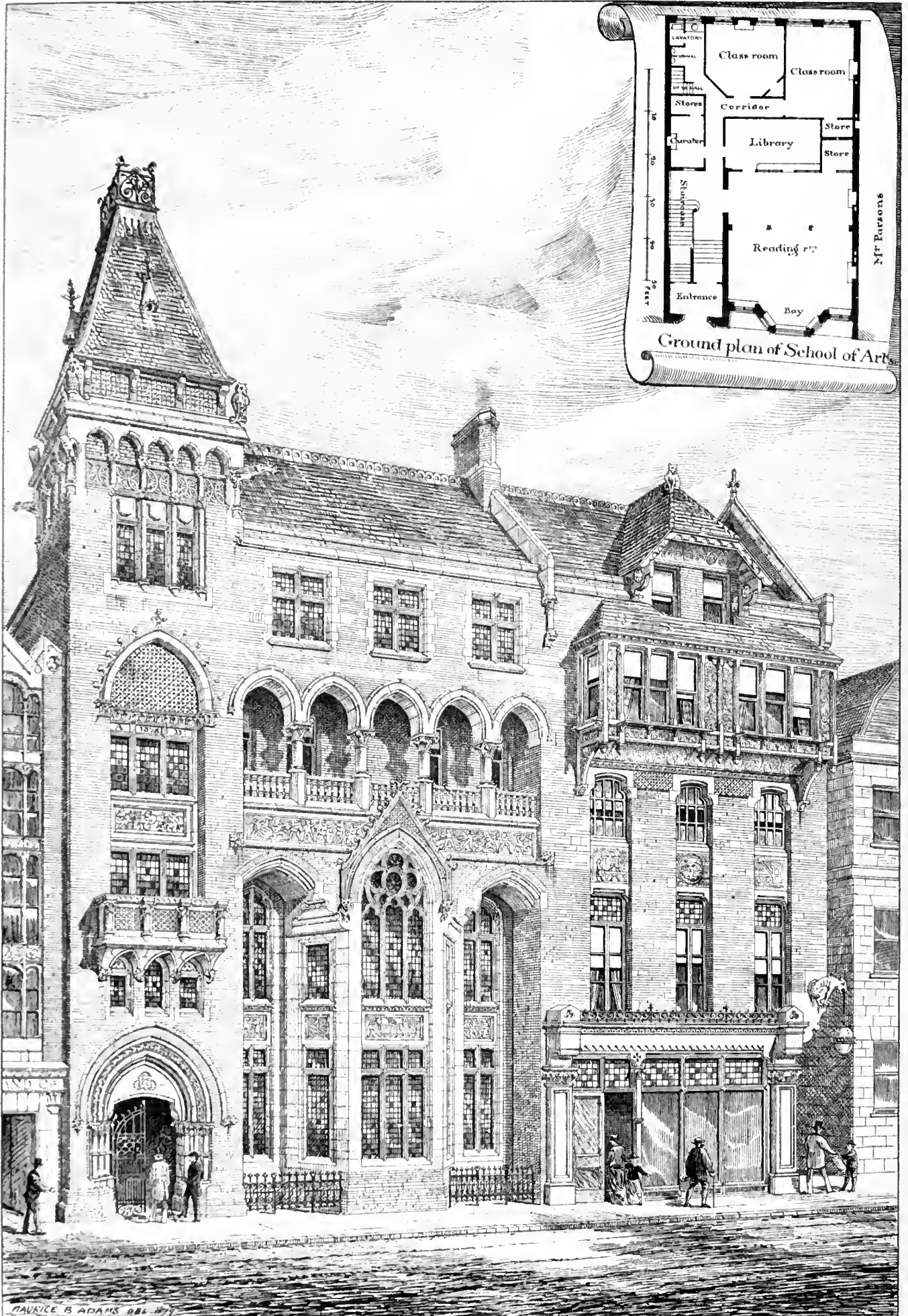
tectural decoration, and the principle to which they adhere, and of which their design is an exemplification, is that in all such work the architectural unity should be made the *sine qua non* of the employment of pictorial appliances, and that the painting or sculpture should distinctly be conformed to the architectural composition. The theme chosen by Messrs. Pullan and Wilson is the *Te Deum*. The dome is divided into eight sections by broad decorative ribs, painted and moulded, and the rib panels filled with arabesques in monochrome. At the bases of the ribs are eight thrones, on which are seated as many prophets. The thrones are architecturally designed, with cornices, pilasters, and niches. Over the cornice of each, to carry the human element into even the design of the ribs, stands an angel erect. The ribs terminate at their summits in foliated capitals united by arches, surmounted by frieze and cornice with pendentives. Between these ribs an architectural composition runs round the dome to support, divide, and facilitate the grouping of the human and angelic figures which form the dominant element of the entire design. The Evangelists that already occupy the spandrels will be included in this plan. The dado contains a decorative design, and in the podium above it are ranged the martyrs, the drum or tribune, as it is here called, beneath the dome not being included in the present design; but, if this were accepted, it is proposed to include the drum in the system and arrange it with a series of men of all nations representing the Church—"The holy Church throughout all the world doth acknowledge Thee." Then would come the martyrs—"The noble army of martyrs praise Thee." In the colonnade above the podium are eight Apostles, each (omitting the Evangelists already there) under a baldachin and seated on a throne, continuing the theme—"The glorious company of the Apostles praise Thee;" and above the architecture the hollow space of the true dome contains figures of angels rising and vanishing in space, and still above them, around and beneath the lantern, are cherubim and seraphim, while in the cupola of the lantern is the Lamb. The design prepared by Messrs. Wilson and Pullan is of one section, the eighth of the project, and the figures are intentionally borrowed from the best known representations of the old masters, it not being their intention to suggest them as the designs for the individual figures, which will be left to the artists charged with carrying out the suggestion contained in the illustration of the *Te Deum*. It is said to be the intention of the artists to send the design to London shortly, in order to offer it for the consideration of the committee for the completion of St. Paul's.

JOHNSON'S CLIMAX DOVETAIL RECESSED BRICKS.

MR. A. JOHNSON, of Handsworth, has patented an invention which will save time and trouble, and avoid damage to walls in the fixing of woodwork. The idea consists in the manufacture of bricks with dovetail recesses for the reception of wooden pads to which may readily be secured door-jambs, casings, skirtings, cornices, angle staffs, architraves, shelving bearers, shop fixtures, boarding, or any other kind of woodwork. The recesses are of varying sizes and forms to suit the different classes of work intended to be fastened to the pads inserted in them. By the adoption of the invention which is inexpensive in its application, all necessity for plugging is avoided, the work can be fixed truer, time, labour, and nails will be economised, and all cutting of brickwork avoided. Several large brickmakers have already obtained licenses of the inventor for the manufacture of the recessed bricks, which we have little doubt will soon come into general use.

COMPETITIONS.

BIRMINGHAM.—About forty-six sets of plans have been received of the Wesleyan Memorial Building, in Bishopsgate-street, for the intended Wesleyan College at Birmingham. The committee have not yet made a formal inspection of the drawings, but will meet on the 12th inst. to consider the matter. Mr. Alfred Waterhouse, A.R.A., has been retained to assist in making an award of the premiums, and in selecting a design for execution.



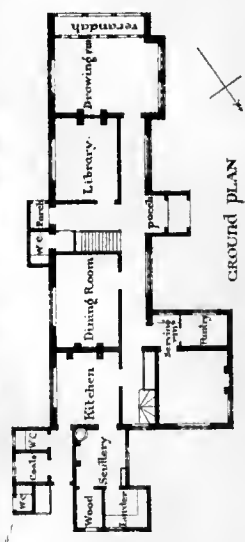
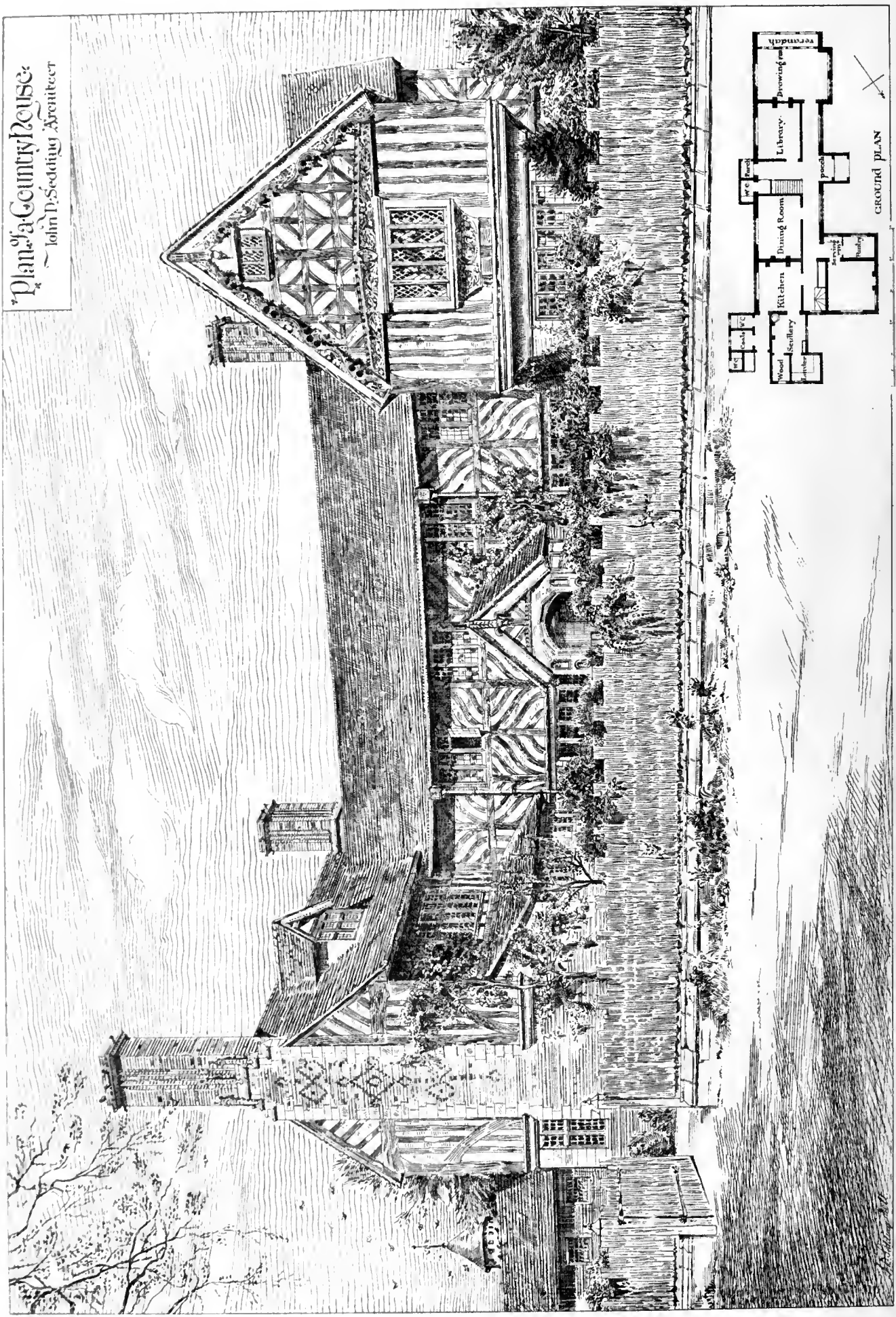
PAULICE B ADAMS DEL. 1879

CLAREMONT BUILDINGS HASTINGS W. L. VERNON ARCHITECT.

Photo-Lithographed & Printed by James Akerman, 6, Queen Square, W.C.



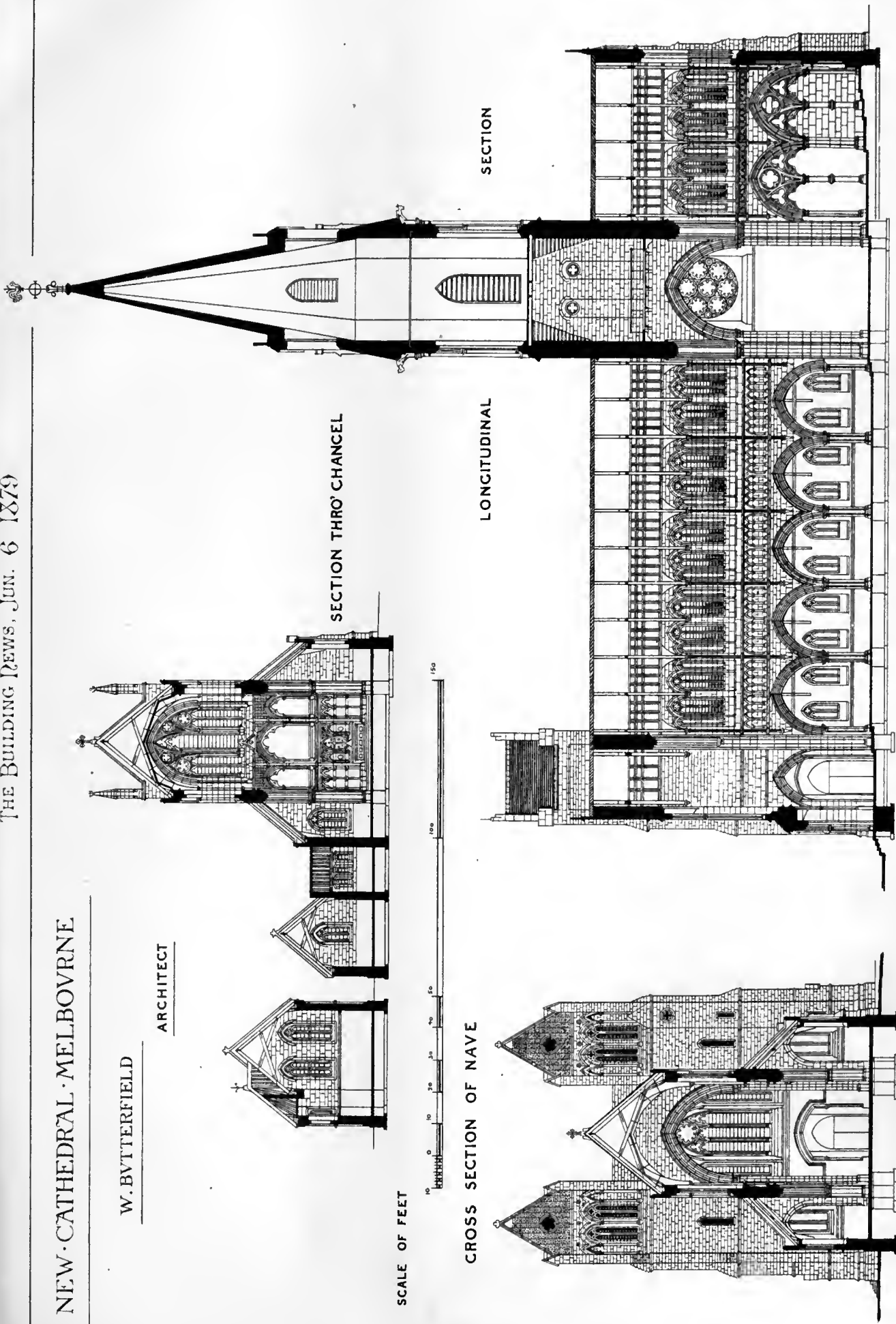
Plan of a Country House.
John H. Sedding, Architect



NEW CATHEDRAL MELBOURNE

W. BUTTERFIELD

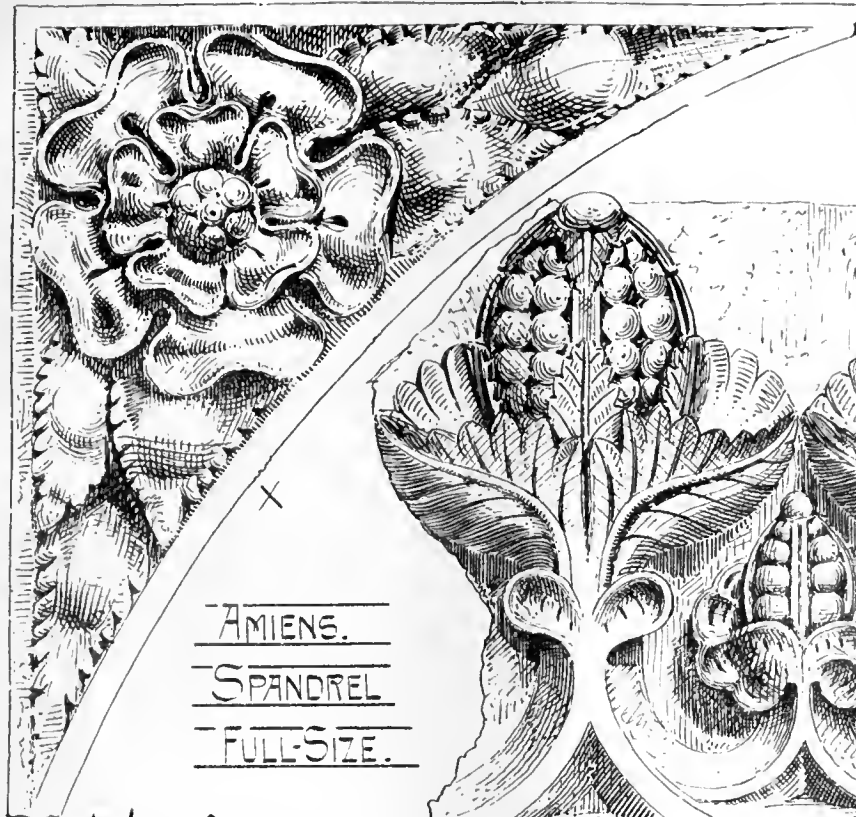
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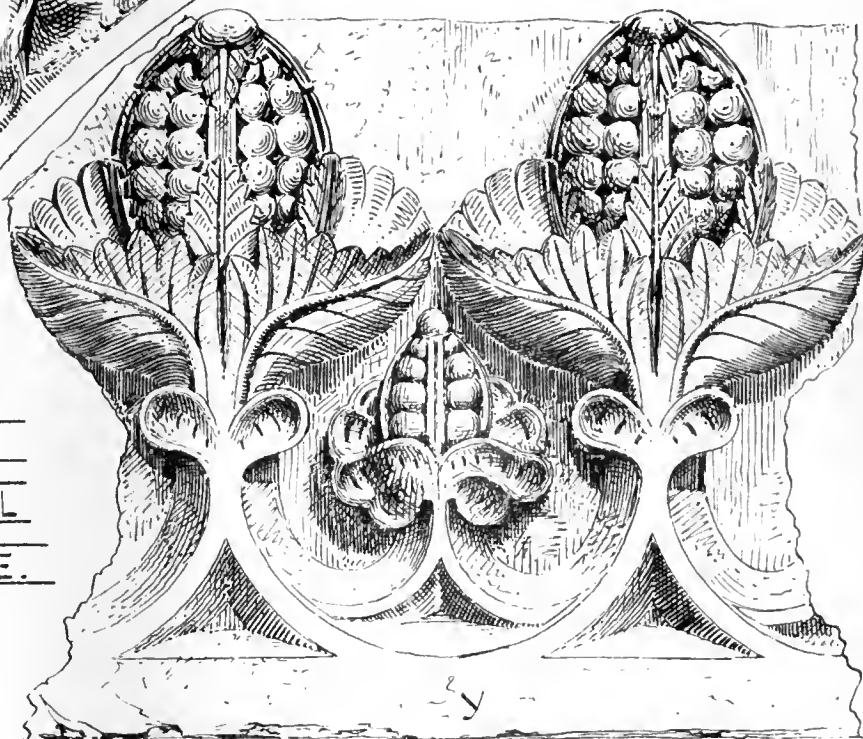
MAURICE S. ADAMS DEL.

ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB

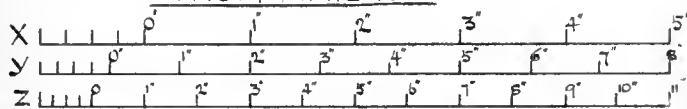
ORNAMENT FROM
AMIENS AND SALISBURY
CATHEDRALS.



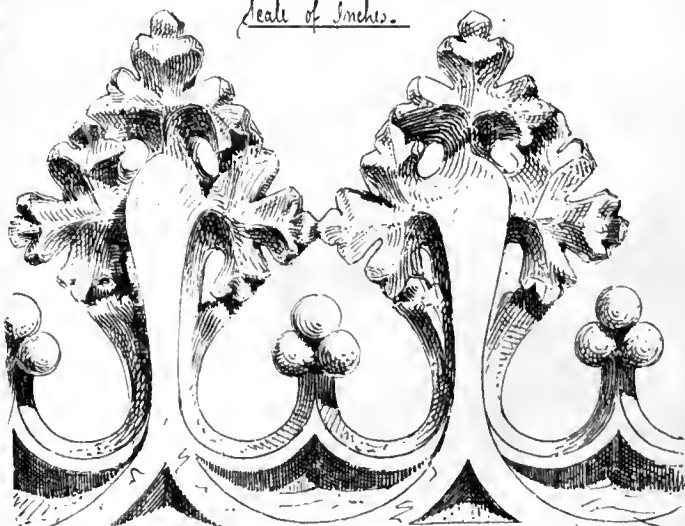
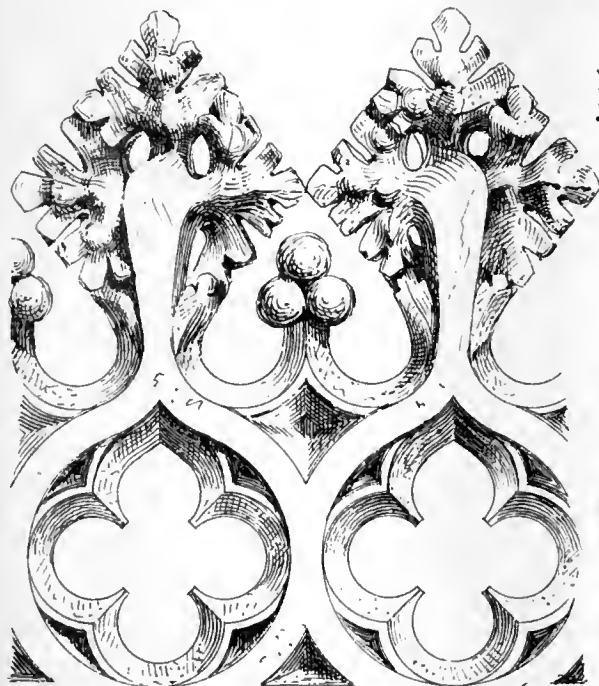
J. Frank Pennington.
del. April 1879.



FROM AMIENS



Scale of Inches.



SALISBURY. BRADISHING FROM THE AUBLEY CHAPEL.

THE CITY OF LONDON SCHOOL COMPETITION.

A STRANGE reticence has been observed by the City of London School Committee in respect of the designs submitted in competition for the new building on the Thames Embankment, and this reserve is all the more inexplicable when we contrast it with the action of other public bodies. Indeed, we do not see what object—except, indeed, a sinister one—can be gained by maintaining such secrecy respecting the action of the committee in the selection of the premiated plans; certainly, at least, there can be no sufficient justification for shutting out the professional press from a view of the designs. Our own knowledge of many of the designs that have been submitted, and a brief inspection of them, at No. 17, Aldermanbury, where they are at present looked up from view, enable us to say that a few clever plans have been sent in out of the 53 sets submitted, several of the authors being very well-known men. Out of these the sub-committee have, we understand, selected for consideration the designs submitted under the mottoes "Live and Learn," "Simplicity," and "Playground," and we further believe that at the meeting of the committee on Wednesday it was decided to place "Live and Learn" first. The drawings have been arranged on screens in bays, round a central lighted wall space of the empty warehouse in Aldermanbury, and occupy the whole of the first-floor, and, as far as lighting and accommodation is concerned, the building affords every convenience for a more public display. The site chosen by the Committee for the New Schools adjoins De Keyser's hotel, and has a frontage towards the Embankment of about 180ft., and a depth of about 320ft. On the west and north it will be bounded by two proposed roadways. The shape of the land is nearly rectangular, and a main front and side entrance have been provided in most of the plans. Among the instructions were a few conditions of importance. Twenty class-rooms had to be provided, each to hold forty boys, with a cloak-room attached; the cubic space of air was to be a minimum of 140ft. per boy, and some of the class-rooms had to be arranged in pairs; a hall for general purposes, distributions, &c., to hold 1,000, had to be provided; a dining-room for 200 boys, capable of sub-division into four separate rooms; a lecture-room on the top floor, besides laboratory, class-room for chemistry, playground, &c. Three premiums of £300, £200, and £100 were to be awarded to the three selected designs.

From a general survey of the plans, the authors appear to have adopted either a symmetric or an irregular disposition of the parts, and they may be roughly divided into those having a central hall or assembly-room, and those with a more or less one-sided arrangement. The former are the more numerous. The larger number of drawings show a rectangular arrangement; that is to say, the plan more or less fills up the site, and in many instances to the obvious loss of playground area, which should be a matter of primary importance in the selection of a design. We observe that the favourite idea is to place the assembly-hall in the centre, round which are the corridors and class-rooms, the official or secretaries' and masters' rooms being located in the front. This is, without doubt, a very obvious principle of planning, and would strike one as the easiest mode of arranging the accommodation; but there are certain serious objections in the way of many of the suggested arrangements on this principle that strike us. One is the area taken up, the awkward means of exit provided for the pupils when leaving the hall for their respective class-rooms—tending to interference or confusion, and

the want of general supervision and lighting. As regards the last very important condition, in many cases the light to hall is obtained above the class-rooms, either by a clerestory or from the roof, while the class-rooms are lighted separately from the sides or from skylights. The central, quadrangular hall arrangement has been followed by many of the competitors, who, to all appearance, have scarcely solved the above difficulties, while the provision of staircases, in some instances, is certainly defective. Touching the entrances, too much importance cannot be attached to a direct passage from the main Embankment entrance to the hall, and so as to avoid any contact with the officials and masters. The hall, intended to seat 1,000 persons, has been variously computed, but the main consideration should be a good shape to aid general supervision by the masters, and also for sound. Some of the plans by their mode of seating ignore these considerations, though they generally appear to show ample lighting. The class-rooms should be grouped round the hall, be well lighted, either from the left-hand side of the pupil or from top lights, and should each have its separate lobby for hats, &c. Another point is the proper position for the lavatories and closets; in some instances these are inadequate or badly placed, and it is requisite that at least two sets, one on each side of the hall, should be provided. The head master's room and class-room ought to be in proximity, if not in direct communication; the dining-room should be conveniently placed, in connection with the chief corridor; and the laboratory and chemical department communicating, but in some part of the building removed from the class-rooms and the risk of accident. Lastly, the cooking department should be either above or below the dining-hall; the former is the more desirable position for it. A few of the competitors have adopted a circular end to the assembly hall, but the radiating principle of disposing the class-rooms has been adopted in one instance, by the author of the design marked "Blackfriars." This competitor has a semi-circular plan of hall with radiating passages and seats, the platform being placed in the centre of the straight side. Round the outer periphery of the hall is a wide corridor which gives access to seven class-rooms, each 20ft. square, lighted on the outside and separated by cloak-rooms. Direct access is thus obtained from the radiating passages of the hall to the class-rooms. At the angles of the semicircular corridor with the front range are the staircases leading to the upper floors with lavatories, &c., behind, and these are connected with the principal entrance by a straight corridor, from which the master's, assistant-master's, secretary's, and other official rooms in front are entered. On the first floor the class-rooms are continued, the front block having four arranged in pairs by sliding-doors suitable for special classes, such as drawing. All the class-rooms, twenty in number, are placed on the ground and first floors, the upper floor in front being devoted to a central natural science lecture-hall, over entrance with the chemical department on the west, and the cooking department on the east. The hall is lighted by clerestory windows and from the roof. The Embankment façade, of three stories, broken by a bold central projection in three bays, and by end wings, and is in the Renaissance style; there is an ample playground in the rear, and the cost is estimated at £48,500. The author sends an alternative plan, showing a rectangular hall. We note three designs in which the rectangular plan has been adopted with more or less success. In style, the architects have generally taken some version of Classic for their design. We note a few of Italian and Queen Anne character, and one rather striking example of the latter style shows the

front broken by a series of flat mullioned windows, with gables, with a rather queerly-shaped tower on the eastern return, and a considerable breaking back of the façade. The author whose motto is "Concentration," and who has a large hall 123ft. by 64ft., surrounded by an open arched corridor, has cleverly managed to bring in the dome of St. Paul's and St. Bride's steeple as a help in balancing his composition. Thirteenth Gothic is not unrepresented; for instance, there is a well studied design by one of the leading Gothicists, in which the front hall is made to play an important part in the elevation, and another design in a later type by the architect of one of our large public City schools. We hope to be able to give some further particulars shortly.

AN ARCHITECTURAL EXCURSION AT STAMFORD.

A JOINT meeting of the Lincoln, Northampton, and Leicester Architectural Societies was held in Stamford last Wednesday and Thursday week. After attending morning prayer at St. Mary's Church, the edifice was examined. An excursion round the town was then made. With regard to an interesting cellar on St. Mary's-hill, Mr. Fowler remarked that it had been longer than it now is, and was of about the date 1200. Precentor Venables said in olden times it was usual to build large houses on vaulted cellars. The remains of the Manor Court were next inspected. The party then climbed the Castle-hill, where the Rev. C. Nevinson gave a history of the stronghold. Browne's Hospital was next visited, and it and its curious contents afforded considerable gratification. Mr. Neale said the stained glass there would stand first in the country of its date; the handling and colour were excellent. An interesting cellar under the Red Lion Inn, which has stone vaulting with somewhat thin and chamfered ribs, and which is said to be early 15th century work, was inspected; and the party then went to the house opposite the Conduit, lately occupied by Mrs. Bishop; the date of an arch there, the existence of which appeared to have been unknown to many of the townspeople, was referred by Mr. Neale to about the year 1200, the interesting capital affording very good testimony. St. Leonard's Priory was much admired, and the critics were deeply interested in the several gradual transitions met with in the north arcade and the west front. The shafts and capitals of the latter were assigned to about A.D. 1200. At St. George's Mr. Neale entered into the oft-discussed question of certain piers in the north arcade; differing from the Rev. G. Ayliffe Poole, he believed that the circular and the octagonal parts had all been built up in proper gradation, and as now shown. The window of the tower was the only Decorated one in the town. There was nothing peculiar about the tower except its ugliness, i.e., it was oblong. Some of the glass in the south wall of the chancel was as good as that at Browne's Hospital, which was saying a great deal.—The visitors then repaired to the Assembly rooms for luncheon.—In the evening a meeting was held in the Assembly-rooms; the Bishop presided. The Bishop advocated the foundation of a county museum. The Rev. G. A. Poole read a paper with the title "Fragments of Diocesan History in the time of Charles I. and Charles II.," in which he described the troubles of the clergy in the Peterboro' diocese during those times of civil strife. Mr. Neale, F.S.A., followed with a paper on "St. Martin's and St. Mary's churches," in which he let the stones tell their own history. He suggested that at St. Martin's there should be a record stating where much of the very fine glass came from. Referring to the west door of St. Mary's, Mr. Neale differed from other writers, and gave reasons for believing that the pointed arch and the semi-circular one beneath it are the work of the same architect. He suggested that the tower be opened out into the church. On the following day, the party visited Ketton, North Luffenham, Exton, Empingham, and Tickencote.

The coffer-dam at the new dry docks now in course of construction at Southampton gave way on Monday night.

OUR COMMONPLACE COLUMN.

GREENSAND.

THE name is given to two divisions of the Cretaceous measures, so-called from the green specks of silicate of iron sometimes formed in the beds, and which give them a green colour. The Upper Greensand consists of beds of sand, generally of a green colour, with masses of calcareous grit called firestone. The strata in the cliffs of the Isle of Wight are of considerable thickness. The Lower Greensand consists of a large series of indurated sandstones and clays, with occasional calcareous beds. The sands preponderate in the Upper and the clays in the Lower portion. The calcareous stone is called Kentish Rag, and is much used for building in Kent and Sussex. It is a highly fossiliferous limestone.

GRIDIRON.

A gridiron is used in Christian art as a symbol of St. Lawrence, Deacon and Martyr. He is usually represented as holding it in his hand, on account of his having been martyred upon one. Sometimes, however, this utensil is symbolical of St. Faith. A gridiron with spikes is symbolical of St. Vincent, the instrument of his torture.

GRIFFIN.

Griffin or gryphon (Gr. *γρυφός*, hook-nosed) is a mythic animal with the head and wings of an eagle combined with the body of a lion, symbolical of swiftness and strength. It is frequently found in Heraldry and Christian art. The earliest example of this animal, Fairholt says, is that on a bronze patera which the Samians ordered to be made about B.C., 640. In Christian art the griffin is symbolical of vigilance, and when found on tombs it is the guardian of the dead. M. de Caumont speaking of it that Pliny, who has been followed by the learned Mediaevalists, says that griffins are a kind of monster which dig up gold from the mines, and devote their whole strength to preserving it.—C. F. W.

GRILLES.

Grille enclosure screens to chapels and tombs are common, both in this country and in France. One of the best English examples is that round the tomb of Queen Eleanor, in Westminster Abbey. In France and Germany grilles are more numerous. Augsburg and Nuremberg are particularly rich in this kind of metal-work, in which scrollwork and crossbars, with sprays of foliage and geometrical forms appear. Seventeenth century examples of tomb grilles may be seen at Salzburg, in the cemetery of St. Peter. Generally grilles are of hammered iron, put together by rivets or clips, though in most of the best work riveting is more rarely used than welding. In the square-bar work the bars are halved and welded together, and in round-bar, eyes are formed, through which one of the stalks passes. In the former kind the diagonal bars are, in one direction, placed square, and in the other, edgewise, the latter passing through the former. For further information and detail, see the valuable paper by Mr. Penstone, in the BUILDING NEWS, p. 613, ante; also V. le Duc, *Dict. Rais.*, under "Grille."

GROIN.

Groin (Ice. *greina*, to divide) is the angle formed by an intersection of vaults (Parker). All the principal Gothic ceilings or roofs were groined. At first the groining was left plain, with merely the edges chamfered, as in the chapel of the Pix, Westminster Abbey (1060-1066). In Peterborough ribs are introduced. Moulded are also to be seen at Salisbury, Lincoln, and Durham Cathedrals, &c.

GROTESQUE.

A style of ornament which owes its name to the discoveries made in the baths of Titus and other Roman buildings in the 13th century from the Italian word "grotto," a subterranean chamber. In the Renaissance we find this kind of ornament much used. It abounds in transformations from the animal to the vegetable, and mingles in fantastic confusion all conceivable forms of nature. The Mediaeval artist delighted to indulge in compositions of the grotesque, as we find in carved capitals, bosses, string-courses, and carved work generally; he often made them suggestive of some quality, such as fierceness; generally these inventions were employed in the service of religion to create fear, and to embody the passions and vices of the world. We doubt

the value of them now, as they have lost their original intention, and it is at least open to question whether such repulsive creations as many of the latter are have a rightful place in architecture. See illustrations in BUILDING NEWS, also article on "Grotesque Animal Representations," p. 178, Vol. XXXV.

GROYNES.

These are small dykes to protect river banks, projected at right angles thereto. Professor Rankine, in his "Manual of Civil Engineering," says "each groyne protects a portion of the bank of about five times its own length, and usually causes the current that sweeps round its point to scoop out an excavation in the bottom of the channel of a breadth equal to about one-quarter of the length of the groyne, the material scooped out being deposited in the space between the groins." He adds they are injurious to the regularity of figure and stability of the bottom of the channel, and should only be used as a temporary expedient to protect the banks until better works can be completed. Groynes are constructed generally of loose stones, or of piles and planks, though concrete in blocks has been successfully used in protecting coasts exposed to a rough or heavy sea. At Brighton the timber groynes have been replaced by concrete blocks, and considerable accumulation has accrued by their adoption.

GULES.

A term used in heraldry for red. In print it is represented by parallel vertical lines covering the field, &c. In descriptions it is written gu. Mr. Boutell gives the following hints for its use in illuminating or blazoning. "Orange vermilion, either pure or mixed, with a very little cadmium yellow or Chinese white, and still less gum; shade with carmine, or crimson lake and gum."—C. F. W.

GUTTÆ.

Guttæ (*gutta*, a drop), small conical ornaments used in Doric architecture, beneath the mutules of the cornice, beneath the tenia of the architrave, and under the triglyphs (Parker). They are supposed to represent raindrops.

GUTTER.

A channel for water, as applied to buildings, is of great antiquity. The Greeks used gutters at the eaves of their buildings formed by hollowing out the corona or upper member of the cornice. The water was discharged through small openings or gargoyles in the shape of lions' heads.

Roman gutters were often formed by tiles in cement.

In the Middle Ages the water was collected in gutters behind the parapets and discharged through the buttress-heads or gargoyles in a number of small streams. Ultimately the use of lead pipes to carry the water direct to the ground superseded the gargoyle, and many tasteful heads to receive the water still exist of the 15th and 16th centuries. See Details of Lead-work, in Vol. XXXV., from Haddon Hall. The square form of pipe was common, and it has many recommendations in its favour, one being the capability of the pipe to expand during frost, and so preventing bursting, besides architectural reasons. For lead gutters 7lb. to 8lb. lead is necessary; they should have a current of at least $\frac{1}{4}$ th of an inch to the foot, though lin. in 10ft. is commonly allowed. At the backs of parapets and chimneys the lead should turn up against the wall 5in. to 8in., according to circumstances, depending upon exposure to wind and pitch of roof. The flashing or apron should be of the same width. In the measurement of gutters take the length of gutter by average width, state thickness of gutter-boards, and size of bearers distance apart. Lead boards are taken separately. The drips and cesspools are numbered. In roofs with projecting eaves the gutters are often sunk into them, and are called blind gutters.

GYMNASIUM.

A gymnasium (*γυμνασιον*) was, with the Greeks and Romans, a building for philosophers as well as youths, for the training of the mind as well as the body. They were first built about the time of Solon. Grammar, music and gymnastics constituted the whole course of a Grecian youth's education, so that this last was held in very high regard. They held that a *mens sana* must be accompanied with a *corpus sanum*. It was in the gymnasium that Greek artists learnt that know-

ledge of the human form which they sculptured with such exquisite proportion. The celebrated baths of Caracalla included gymnasias, stadia, temples, academics, lecture-rooms, &c. It should be noted that the Germans use the term gymnasium for "mental schools, preserving in part the old classic meaning, whereas an Englishman by the same term always means a school for bodily exercise." (See Smith's "Dict. of Antiq.")—C. F. W.

GYMNECEUM.

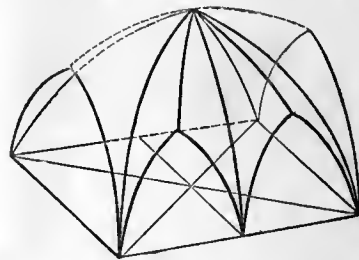
Gymneceum (*γυμναστήριον*), the women's apartments. In a Greek house the men's apartments were always in the front, and the women's behind, rarely on an upper story.—C. F. W.

HAGIOSCOPE, OR SQUINT.

Oblique openings or slits pierced generally in the walls or jambs of the chancel arch, intended to give a view of the high altar to those seated at the east end of the aisles or chapels. These openings were sometimes arched and cusped. Their most important use was doubtless to enable the acolyte appointed to ring the sanctus bell to see the performance of high mass, and to ring it at the proper time. The English form of the word "squin" is far more appropriate than the Greek one of hagioscope as applied to a Mediaeval building. This feature, according to Parker, abounds in the neighbourhood of Tenby in South Wales, though examples occur at Haseley, Oxon, Chipping Norton, Crawley Church, Hants, Bridgwater Church, &c. The same authority says they are usually about a yard high, and about 2ft. wide, often wider at the west end. They occur in other situations, but always in the direction of the high altar. See illustrations in Parker's Glossary.

HEXPARTITE.

A species of groining where each bay is divided into six parts, instead of the commoner division of four, and where the diagonal ribs embrace two bays of cross vaults. The crowns of vaults



of this kind are not always level, but have a slight rise, so that they partake of a domical character. The choir of Canterbury has this description of vaulting.

HALL.

French *salle*, *salon*. This was the principal apartment in the Middle-Age dwelling. In the Norman castle the hall was generally in the keep above the ground floor, though in later examples they are chiefly on the ground floor, as at Westminster. There was a hall and one "solar" or sleeping apartment, and this arrangement prevailed with slight modifications during the 12th and 13th centuries. At the end of hall was the daie, on which the lord of the manor had his table and entertained his honoured guests who sat with him; his retainers sitting at another table in the lower part of hall. The hall was a characteristic feature of the feudal system of building, and when that system died out the large common hall was lost in other and more numerous apartments. The roofs especially were very handsome and richly carved, as those that still exist bear witness. We may mention those of Guestion Hall, and the Priory Rectory, Malvern, as choice instances. Examples are to be met with in many counties of England; the best known are Westminster, Guildhall, Crosby Hall, those of the Inns of Court, Hampton Court, Eltham, Ightham, Kent; Mayfield, Sussex; Guestion Hall, Worcester; Great Malvern Priory, Cobham, Kent. In some halls, bay windows are formed at the ends of the daie, and this feature is to be observed at Hampton Court.

For details of hall see "Dollman's Analysis of Ancient Domestic Architecture"; "Parker's Domestic Architecture," &c.

Many fine halls were visited by the Royal Archaeological Institute last year (1878) in the neighbourhood of Northampton, fully described

in our reports of that visit (see page 127, Vol. XXXV.), such as Rushton Hall, Kirby Hall, &c. Illustrations of many will be found in back volumes. See also correspondence touching Wollaton Hall, p. 712.

MUSIC HALLS.

For proportions of great music halls we refer the reader to the "Dictionary of Architecture," also to page 611, Vol. XXXIII.

THE INFLUENCE OF ROUGHNESS ON THE FLOW OF WATER IN PIPES.

THE literature of practical hydraulics is yearly becoming so voluminous that the engineer will be glad to have recourse to tables prepared for him, upon which he can place reliance without the trouble of working out for himself theoretical formula. An immense deal of labour and thought has been spent in the search for a mathematical expression for the value of the mean velocity of a stream of water; but such labour has been only of approximate value, and that under certain conditions, for it is evident a formula applicable to large channels and rivers would be useless for pipes, and a formula for a rough channel would be equally inapplicable to one of a smooth perimeter. Du Buat had considered that the velocity was quite independent of the material forming the perimeter, whereas the experiments of Kutter, D'Arcy, and others, have recently shown that the degree of roughness has much to do with the velocity. Kutter published a new formula, which has been translated by L. D'A. Jackson in a recent work noticed by us at the time, and as the formula was too complicated for general use, a diagram was shown that could be made applicable to both large rivers and small channels. Mr. R. Hering, C.E., in a paper on "The Flow of Water in Small Channels," in the *Transactions of the American Society of Civil Engineers*, shows a modification of Kutter's diagram which obviates the inconvenience attending the use of it, and Jackson's translation, which was found too small for accuracy. In this diagram, the relations are obtained in English measures between the mean velocity (v), Kutter's coefficients (c), the mean hydraulic radius (R), the roughness of wetted perimeter (n), and the slope of the water surface (s); a vertical axis has the coefficients c graduated on the left with the grades in feet per 100 on the right side; the horizontal axis has the mean radius marked above, and the mean velocity in feet per second below. To the left are formed hyperbolic curves indicating grades from zero to 0.4 per hundred. Degrees of roughness, from planned timber to stony soil and channels impeded by detritus and vegetation, are shown by radiating lines from a certain point obtained by experience and cross the curves. Cement, plaster, rough timber, and brick materials used for lining sewers are thus shown. By this simple diagram, containing the relations of the principal quantities in a practical form, the separate values of any one can be obtained by a simple operation, which, without a diagram it would be of little use to explain here. For more convenient use, a series of graphical tables is added, developed from the relationship existing between the five quantities above enumerated. These are constructed on cross section paper noting the grades along the top, and the discharges along the side, and are confined to circular and egg-shaped sections calculated for three values of (n), or roughness. These graphical tables are very convenient for practical purposes, while they are quite accurate enough for all ordinary requirements. The writer observes, "All the known elements occurring in the problem of the flow of water in small channels, giving the results in conformity with the formula of Ganguillet and Kutter can therefore be arranged in a convenient and practical form. The diagram will give the values of v , n , c , and g in a few moments, and the tables prepared for special shapes of water section will give the size and discharge at a glance, and by examining the effects of slight variations of size or grade, will enable the engineer easily to determine the most economical design." Three diagrams are added to prove the influence of roughness upon the discharge, and that the effect increases with the smoothness of the wetted perimeter, and inversely as the size, so that "the smaller the channel the better it will pay to increase the degree of smoothness to its highest practical limit." To take one instance given, an open circular channel 3ft. diameter, at

a grade of 1ft per hundred when built of rough rubble, shows a mean velocity of 6.2ft. per second, but when carefully plastered with pure cement, or with a thick coat of natural asphalt, it will give a velocity of 13ft. per second, or more than double the discharge. From the results thus obtained, the value of smooth glazed stoneware pipes, or asphalted pipes, is placed beyond doubt particularly for small sewers, and we have a further proof of the advantages of truly laid pipes. To show the practical use of the plotted tables we have been referring to, let us take another instance. Given 500 acres to be drained of an inch rainfall, the available grade being 0.3 per 100. We require to know the diameter of a circular brick-built sewer. Referring to plate IV., we find the horizontal line indicating the discharge of 500 cubic feet (being equivalent to the drainage of 500 acres), and where this intersects the vertical ordinate indicating grade, we read on the radiating line the required diameter of 8ft. and a velocity of 10ft. per second. We cannot devote more space to the subject, but recommend Mr. Hering's paper and graphical tables to the attention of all interested in drainage.

HINDLE'S PATENT ASHLAR CONCRETE.

A NEW patented system of concrete building has been brought to our notice in a pamphlet under the above title. The patentee, Mr. Thomas Hindle, of Liverpool, to use his own words "unites the block and monolithic systems of concrete construction" by which it is claimed that the difficulties attendant upon each of these modes are removed and contraction avoided. The plan, from the description given of it, is certainly very simple: it consists of concrete blocks or slabs suitable for every kind of construction, such as for sewers, walls for gasometers, reservoirs, sea and retaining walls, house building, &c. The "slab" is in ashlar about 2in. thick, and can be made of any length and depth, while the "block" is thicker and can also be formed to any dimensions. The slabs or blocks are made in moulds with a bevelled sinking or groove on each edge of the block, which when put together are filled up, making a homogeneous facing. For cottages slabs $1\frac{1}{2}$ to $1\frac{3}{4}$ in. are recommended, with one tie or bond to every superficial yard, and for all partition walls blocks three or four inches thick. The illustrations given—by the way, rather badly drawn—show walls built hollow of these slabs, the inside being filled with rough concrete. Walls to imitate stone ashlar with grooved joints and rusticated quoins, gate piers, and window dressings, are illustrated to show the application of the material, but we regret a more original adaptation has not been aimed at. The cost of a yard super of a 4in. wall is estimated at 2s. 5d., or at £11 1s. 1d. per rod; that of a 9in. wall, 4s. 2d., or £9s. 9s. per rod, and of a $1\frac{1}{2}$ brick wall 5s. 10d., or £8 16s. 6d. per rod. These prices allow for concrete to cost 5d. per cubic foot, and for making, erecting, and filling in the hollow. Mr. Hindle's system dispenses with costly appliances; it adopts a reasonable mode of wall construction not open to the objections of the monolithic or filling-in systems, and we can recommend it to the attention of builders where the manufacture of concrete can be carried on economically. The system is being worked by Mr. Samuel Vestey, of 5, Matthew-street, Liverpool.

THE YORK FINE ART AND INDUSTRIAL EXHIBITION.

I SEND the following in continuation of my notes printed on p. 568:—In the South Gallery the exhibits are now *in situ*. Mr. C. Green, of Sheffield, has various articles in which moulded bronze panels form the chief feature. The large ebony cabinet is especially worth attention; and the bronze panels, three with child figures in full relief, are excellent. Yates and Co., Wilton, have a hand-made Saxony carpet in blue and green, and a real Axminster of less conventional pattern. The productions of Mr. Snowdon, Rochdale, are conspicuous for the excellence of workmanship, the designs being mostly very simple. The bed-room suite in sycamore, with mouldings in walnut, is quiet and altogether pleasing. The exhibits of Roodhouse and Sons, Leeds, also deserve a good position. The bed-room suite is Anglo-Japanesque in design, that of the dining-room Jacobean.

The bed-room suite of Isaac Brown, York, is very simply treated, the only ornamentation being in lines of inlaid wood, white and black triangles alternately. The bed hangings, yellow ground, are rich in appearance, but scarcely harmonise with the material of the furniture.

Before leaving the galleries, I must allude to the show-cases, which are all of a commonplace character, and are mostly finished off at top with brown paper or plain deal, although they are as much seen from above as from the sides. Under the North Gallery Messrs. Barrett and Leggott, Bradford, have several chimney-pieces, with grates, fenders, and fittings complete. One chimney-piece is of polished oak, simple and chaste in design; another is of white marble, and is suited for the drawing-room of a noble mansion; the dogs and fender are brass; the next is in black marble, of a bold Renaissance design. The middle panels (bronze) of the canted sides have female figures in full relief under alcoves; while excellently-modelled nude male figures, in positions reminding one of Michael Angelo, guard the fire-gods. Above the shelf is a large mirror in substantial, well-designed oak frame, with segmental pediment top, and side shelves for the display of vases. The designs of these chimney-pieces are superior to those which obtained a medal at Leeds in 1875, if we may judge from the drawings exhibited. Rowntree and Sons, Scarborough, are represented by a buffet in light, unpolished oak, a butler's sideboard, and dining-room chair in the same material. Colman and Glendenning exhibit specimens of their desks of various designs and all very good. Robson and Sons, Newcastle, have a bed-room suite in mahogany, and, like Messrs. Ogden, have chosen carpets and hangings to help the effect. The chair-seats are too light in colour. Messrs. Jones and Willis have a good show of ecclesiastical work, including a large and elaborate candelabra and a brass eagle lectern: the chief interest centres in the reredos of Flamboyant Gothic design, in light oak and many other woods, with pierced panels in walnut. The centre recess has an ogee cusped canopy. High up are two small figures of St. George and St. Denis. This reredos was made for the Paris Exhibition, and was designed by Mr. Scott Champion. The altar frontal is in the same style, and elaborately embroidered by hand. The ground work is white figured silk; in the centre quarterfoil, upon a back-ground of blue, is the figure of our Lord holding a golden sceptre. The super-frontal is of rich crimson velvet. The altar furniture, gas brackets, and other articles fully sustain the high reputation of the firm. I had almost forgotten the Sunbury Wall Decoration, with which several of the compartments occupied by furniture are lined with exceedingly good effect.

C. P. E.

ART FURNITURE.—A GRAND PIANOFORTE CASE.

MESSRS. WRIGHT AND MANSFIELD, of 104, New Bond-street, have lately manufactured a grand pianoforte case for Sir Julian Goldsmid, Bart., M.P., a view of which was accorded to us last week, and as an example of inlaid woodwork, we may say we have seldom seen a more superb design. The top and sides of the instrument are of King wood, with a reticulation of tulip, stained, and other choice inlays. In addition to the rich borders, the top and sides have elongated medallions or panels with centre groupings of musical instruments in inlay. The legs are square, and are also richly relieved by inlaid woods of the same description, and the lines and general design are very satisfactory. In style the artist (we believe Mr. Lord) has adopted the Renaissance, or perhaps the geometrical diagonal network of marquetry, which be more correctly called Early Italian, freely treated. The instrument itself has been manufactured by the Messrs. Broadwood. We notice in other parts of Messrs. Wright and Mansfield's extensive show-rooms some very choice specimens of furniture in the Adams and Chipendale styles. One is a wardrobe, painted and highly polished, of a delicate cream or canary buff ground, with painted panels and medallions in the sides, and a large bevelled mirror in the centre compartment. The panelling is richly bordered with fluted margins, with gilt mouldings and enrichments picked out with a bright salmon colour. The panels are painted on copper. Over the mirror, the wardrobe is

finished with a scrolled pediment, while in the side compartments we observe an ingenious swivel hook for hanging the dresses, which revolves on a centre, a very obvious improvement on ordinary hooks. Among the choice examples of furniture in the Adams style, we noted a unique tripod table, designed and executed with considerable taste, thoroughly classic in feeling, and suggestive of the very elegant work of George II.'s time. The table and legs are of mahogany, painted to a cream-colour ground, and relieved by painted ornaments and gilt mounts. In the same style are to be seen one or two sideboards in which simple outline and refined ornamentation are observed; and the connoisseur of old furniture will be gratified by two finely inlaid specimens, one an Italian table, square in form, the top of which is divided into square panels by inlays, and another a choice secretaire of German workmanship. The table is certainly a very good example of the best Italian period. Those who are admirers of furniture of the more classic periods, and of marquetry and bone, will do well to visit the show-rooms of this firm, comprising as they do reproductions of art workmanship from the earlier Renaissance to the later style of Louis the Sixteenth.

Building Intelligence.

ARBROATH ABBEY.—For about a year past the town council of Arbroath, N.B., have been carrying out extensive improvements in the neighbourhood of the Abbey, partly with the object of better opening up the buildings to view, and partly to alter the Abbey-green, which adjoins the ruins and the churchyard, into a public garden or park. With this aim the Abbot's house and garden, which were private property, have been purchased, as have also a number of houses which intervene between the Abbot's house and the green. These it is intended to pull down, and two of these have already been demolished. The Abbot's house, which is inhabited, has been repaired, and the medieval vaults, including the great kitchen, which as well as part of the house is part of the old monastic buildings, have been put in order for the inspection of visitors. The Abbey-green has been levelled down with grass, and enclosed by a parapetted wall and railing, and it is intended by taking down a modern wall to connect it with the extensive garden of the Abbot's House. It is proposed to trench the garden adjoining the church, so as to lay bare the foundations of the monk's dormitory buildings, which are believed still to exist. The chapter house foundations and remaining walls have been cleared of soil, and in the process a number of stone coffins of ashlar, neatly jointed, were found, and have been carefully covered up again. A report of these operations having been communicated to H.M. Board of Works for Scotland, Mr. W. A. Robertson, of Edinburgh, the Surveyor of Works for Scotland, visited Arbroath last week, and inspected what was being done in company with the municipal authorities. The visit was for the purpose of protecting the rights of the Crown, to whom the ruins of the Abbey belong, and for whom the site of the chapter house is claimed. It is understood that Mr. Robertson expressed himself satisfied that the improvements in progress would be beneficial to the public, and it is expected the Town Council's scheme will be completely realised.

ARMAH.—A new Presbyterian Church has been opened at Armah. The style is Decorated Gothic. The exterior walls are built of square blocks of Armah marble, with dressings of Dungannon sandstone. The church consists of a nave and aisles, and accommodation has been provided for upwards of 830 persons. Galleries are placed against the walls on the three sides, and these are seated to hold 350 persons, while 480 can be accommodated on the ground floor. The nave consists of six bays, and is 50ft. in width, including the aisles, and 50ft. in height to the ridge. Octagonal turrets rise at each angle of the building, except at the corner of Russell-street, where a pinnaled tower rises 100ft. high to the belfry. Above this the spire terminates at a height of 185ft. in a lofty copper finial. The church will be heated by hot-water pipes supplied by Messrs. Mungrave and Co. The carving, of which there is a large quantity, has been done by Mr. Harry Hems, Exeter. Messrs. J. and J. Guiler, Bel-

fast, the builders, have executed the works from the designs of Messrs. Young and Mackenzie, Belfast, architects. The cost will be about £10,000.

CHARING.—The parish church of Charing, near Ashford, Kent, was reopened on Friday, the 23rd ult. The restoration, which has been under the direction of Mr. J. P. St. Aubyn, comprises the re-erecting of the nave and transepts, the removal of the western gallery, and the throwing open of the tower and western doorway, the stripping and relaying of the tiles on the roof of the nave and northern transept, the provision of a new roof and windows, and the restoration in flint work of the southern transept, which in 1812 was rebuilt in brick, and was not at all in character with the rest of the sacred edifice. The aisles have also been relaid with encaustic tiles. The large western window has been filled by Messrs. Clayton and Bell with stained glass, representing events in the lives of SS. Peter and Paul, to whom the church is dedicated. The cost has been about £2,400.

LEOMINSTER.—On Tuesday week the south nave of Leominster Priory Church was reopened after restoration by Mr. Edwards, of Leominster, under the direction of Messrs. Scott Brothers. The stonework has all been repointed, and a fine arched oak roof has been put in. An oak flooring has been put down, the passages being laid in with coloured tiles, and the eastern end of the nave is paved with encaustic tiles, supplied from Mr. Godwin's Encaustic Tile Works, at Lugwardine. The oak screen has been removed from the Norman nave and placed in the south nave, where service will in future be held. The screen has been filled in at the bottom between the columns with oak panelling, being divided into three panels, with small oak columns having moulded bases and capitals. A new stone pulpit has also been placed in the nave, supplied by Messrs. Jones and Willis. The partition which has for years past divided the south from the Norman nave has, of course, been removed, but on the other side the south nave is divided from the south aisle by a wooden partition some four or five feet in height, the contrast between the finished nave, and the desolate south aisle, with its uneven earthen floor, being very marked. The seating of the two restored naves consists of cathedral chairs, and both naves were used at the opening services. The organ remains in the Norman nave. The following figures will show the cost at present incurred in connection with the work. Restoring the Norman nave, £3,015; the south nave, £4,263; roofing south aisle, £693; restoring the fifth window from the porch in the south aisle, £473; extras, removing stalls and screens, about £100, thus bringing the total cost incurred so far in the work of restoration up to £8,543 10s. It is estimated that the sum of £12,000 more is required to complete the work of restoration, but this will include not only the interior, but the other portions. There still remains to be restored the four beautiful ball-flower windows in the south aisle, the south porch, the tower, and also the addition to the south nave of an apsidal chancel, the whole with fittings bringing the amount required up to the large sum of £20,000.

LOSTWITHIEL.—The ancient parish church of Lostwithiel was reopened on May 29th after restoration. The edifice, erected in the 13th or 14th century, belongs to the Transition period preceding the Decorated style. The spire, which was illustrated in the BUILDING NEWS two years since, is an object of much interest, spires being rare architectural features in Cornwall, or indeed, in the West of England at all. The lower part is Early English, consisting at the base of a square tower, over which is an octagonal lantern supporting the spire proper. The topmost part of this was not old, and was crippled. Under the immediate direction of the architect for the restoration, Mr. Joseph Clarke, F.S.A., of 13, Stratford-place, Oxford-street, W., this has been rectified. The old-fashioned boxes have been replaced with light modern pews. The old floor, consisting of irregular slates and stones, under which there was an accumulation of filth, has been replaced with a solid bedding of concrete, over which a wooden floor is laid, the aisles being paved with red encaustic tiles. Another great improvement has been effected by the removal of the gallery at the west end of the church, and placing the organ, which previously stood in the gallery, in the north-east corner of the church, near the chancel. The old lath-and-plaster ceiling has been removed, and a

pannelled pitch-pine roof with carved ribs and bosses over the chancel has been substituted. The carved work is by Mr. Harry Hems, of Exeter. The ceilings of the north and south aisles have been similarly treated. The walls have been scraped (the whitewash in some places was several inches in thickness) and plastered, and the stone facings and pillars have also been cleaned. The east-end of the church is lit by a large five-light tracery window, and there are several stained windows in the aisles, the remainder being of cathedral glass. Two small windows have been cut in the west-end of the church in order to relieve the heaviness of the wall caused by the removal of the gallery. The belfry, which was previously entered by a narrow door, is now thrown open to the church. The contractors for the restoration were Messrs. Brown and Phelps, builders, of Lostwithiel.

MANCHESTER.—The new wholesale fish-market at Manchester was opened on Thursday week. The elevation of the market frontage to High-street has been carried out in uniformity with that portion of it which was built about seven years ago. The style is Free Gothic of a Continental type. The newly-built part of the market has four entrances, two of which are for vehicles only; the gateways are of large proportions, filled in with handsome wrought-iron gates, which are probably the largest in the provinces erected for such a purpose. The whole of the wrought metal-work has been executed by the Coventry Art Metal Company. At each angle of the building an oriel window has been introduced, with granite shafts to the jambs, the angles taking a circular form from above the oriels, and at each end the roof is turreted in pavilion form. The architects are Messrs. Mangnall and Littlewoods, of Manchester, and the builders Messrs. Robert Neill and Sons.

MOSSLEY, NEAR MANCHESTER.—The foundation-stone of the new parish church of St. George, Mossley, was laid on Saturday last. This building is being erected on a site adjoining that of the old church, and is in the Late Decorated style. It consists of nave and aisles, 71ft. by 61ft. On the north side of the chancel is the tower, 18ft. square, and 90ft. high, which will contain the organ and an entrance porch. On the south side is the vestry, with heating chamber below; a projecting narthex is formed at the west end by two porches and the staircase to west gallery. The church will seat 1,010 persons, including 230 children in west gallery. The materials are local rubble, faced with outside Yorkshire parpoints and Alderley dressed stone, and the walls will be plastered inside. Pitch-pine will be used for seats, screens, and other fittings. The cost of the whole, when completed, will be about £6,550, including all expenses. The work is being carried out by Mr. Edward Marland, of Mossley, from the designs and under the superintendence of Mr. A. H. Davies-Colley, architect, Manchester.

PECKHAM.—The church of St. Jude, Peckham, was consecrated on Whitsun Eve. The church accommodates 800, and cost £5,300. The architect is Mr. Blomfield; the style is Early English, and consists of nave, aisles, transept, chancel, and vestry. It is built of stock brickwork, with red bands and arches. The chancel has been recently decorated by Messrs. Heaton, Butler, and Bayne. The white marble font has been executed by Mr. Earp.

RINGWOOD.—A reredos in memory of the late vicar, the Rev. George Williams, has been erected in the parish church of Ringwood, Hants, during the past week. It extends the whole length of the altar, rising to a height of 6ft. 10in. It consists of three panels of Derbyshire alabaster, standing on a slab of Sicilian marble. From this marble slab, which forms a retable, rise four clustered bases supporting twelve columns of Devonshire marble, surmounted by foliage caps of Early English character, from which spring the arches of the triplet of gables, which are richly crocketed. The columns are carried up to form pedestals for four angels, carved in white alabaster, and holding quarterfoil shields bearing the emblems of our Lord's Passion. Each panel is lined with a mosaic in gold, by Messrs. Simpson and Son, of London, that in the centre being filled by the Agnus Dei and the other two with the Alpha and Omega. The designer and sculptor was Mr. G. W. Searle, of Brixton. On the south side of the chancel, the fourth lancet-light from

the east end has been filled with stained glass as a memorial to a deceased parishioner. The subject is the "Raising of Lazarus," and the artists are Messrs. Ward and Hughes, of London, who have previously executed other work of similar character in the chancel of this church.

SPARKBROOK.—A new Baptist chapel at Sparkbrook was opened on Whit Tuesday. The style is a modern adaptation of the Early Geometrical style, the materials used being fine red bricks with Bath stone tracery, pinnacles, and copings, the constructive arches and other decorative features being worked out with moulded and ornamental bricks and terra-cotta. The body of the chapel is in the form of a parallelogram, 69ft. long by 40ft. wide, the central nave being divided from the two side aisles by four cast-iron ornamental columns on each side, which support an arched of framed woodwork and the arched timbering carrying an open roof, 46ft. high from the floor to the apex. There are galleries on each side, and a large gallery is carried over the main entrance. The chapel will accommodate altogether 1,120 persons. The building has been erected from the designs of Mr. Hale, architect. Messrs. Davies Brothers were the builders; the iron columns and gasfittings were the work of Messrs. Hart, Son, Peard and Co. The total cost of the chapel is about £7,300.

TIVERTON.—A memorial pulpit has just been erected at St. George's Church, Tiverton. The building is Classical, and the pulpit, designed in the Jacobean style of the early 17th century, harmonises well with its surroundings. It is of wainscot oak, and on plan is hexagonal, each angle being sustained by richly-wrought brackets. The five canopies contain recessed niches, in which stand sculptured figures in bold relief, representing SS. Matthew, Mark, Luke, John, and Paul. The respective emblems of these Saints are also carved. The pulpit is approached by convenient stairs, having massive handrails and worked balustrades. The whole has been designed and carried out under the immediate superintendence of Mr. Edward Ashworth, architect, of Exeter. The carved figures and symbols are by Mr. Harry Heins, of the same city.

THE ELEPHANT AND CASTLE THEATRE, NEWINGTON, S.E., was opened on Saturday night, having been rebuilt after destruction by fire. It is now considerably higher, the accommodation is larger, and the facilities for egress have been greatly improved. The length from back to front, including stage, is 106ft., the stage being 40ft. at the deepest part; the width of the proscenium is 30ft., and the entire width of the house is 67ft. There are four rows of stalls, having two exits, and a pit seating nearly a thousand persons, and surrounded by a promenade with three exits—one 7ft., and the other two each 5½ft. wide. A new feature is a saloon over 50ft. long, on the left-hand side of the pit looking towards the stage; this saloon is built underneath one of the platforms of the Elephant and Castle Railway-station. The dress-circle is approached from the main entrance by a staircase 7ft. 6in. wide, and attached is another saloon. Over this is a spacious amphitheatre and gallery. There are also ten boxes. The dressing-rooms for actors and actresses are in a building separate from the theatre. The internal decorations have been executed by Messrs. Pashley, Newton, and Young, from designs furnished by the architect, Mr. Frank Matcham, of Bedford-row. The principal colour used is a pale green, the front of the dress-circle being panelled out in amber satin. The ceiling is a circular dome, and the top portion of the proscenium is curved towards the auditorium with the aim of increasing the acoustic properties of the building. The lighting is effected by a sun-light containing 206 burners, supplied by Messrs. Z. D. Berry and Son, of Buckingham Palace-road. The builders are Messrs. Brass, of Chelsea.

The new poorhouse and asylum which have been erected at Smithton by the Greenock Parochial Board were opened last week. The buildings, although estimated at first to cost £45,000, have already had expended on them about £100,000. The style adopted, according to a plan by Mr. Starforth, architect, Edinburgh, is Scottish Baronial.

A new Christadelphian synagogue was opened in Lion-street, Abergavenny, on Whit-Sunday. It has been erected at a cost of £200, and seats 130 persons. Mr. John Thomas was the contractor.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—J. W. L.—J. F. M.—M. and Co.—F. and Co.—W. W.—J. D.—W. S. B.—S. E. Co.—A. W. K.—F. R.—F. W. B.—P. and A.

DRAWINGS RECEIVED.—R. N. S., T. G. J., T. E. C., O. W. and Son.

C. O., Leicester. (People who know little about their business are generally willing to work for nothing, and people who employ them deserve all the gratification they are likely to derive.)—PERPLEXED. (You cannot "register" a "patent." Send to one of the patent agents whose advertisements appear in the *English Mechanic* for a copy of their instructions to inventors.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—C. W. D., North West, X. L., Operam Dare, Factable, Colorado Beetle, Be to Its Merits, &c., Ivanhoe, Peter, Che Sara Sara, Melnotte, Sub Silentio, Ieh Dien, "Maggie, alias Such a Dog," Motto J., East Anglian, Nitor, S. in Circle, Ognore, Burswell, Try, Bog, Cleo, Elvée, Honey Dew.

LIST OF SUBJECTS.—1. A row of six labourers' cottages, three having two and the remainder three bedrooms each. A wash and bakehouse to be arranged in the rear. The plans to show all conveniences. Plans, elevation, and sketch. Scale 5ft. to the inch. 2. A garden seat to accommodate six persons. Inch scale, section and sketch. Material, iron or wood.

Correspondence.

RAMSGATE PROPOSED NEW ROAD COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—My attention has been called to a statement under the above heading in your last week's journal, in which your correspondent's information is so utterly at variance with the facts that I am sure you will allow me space to state that neither directly nor indirectly have I engaged in the above competition.

I am totally ignorant of the author of the design imputed to me, and I cannot but feel that a great injustice is done to a competitor whose name I am entirely ignorant of.

Not knowing any of the competitors, I cannot but conclude that some disappointed local celebrity is referred to by your correspondent as canvassing the town, which I hope is as devoid of truth as the previous assertion, for, of one

thing I am sure, all canvassers have kept clear of your obedient servant,

ALFRED R. PITE,
One of the Ramsgate Commissioners.
44, Bloomsbury-square, W.C.,
3rd June, 1879.

TALL FLAGSTAFF.

SIR,—Among the items in your issue of the 30th ult. designated "Clips" is the following:—"A new flagstaff, erected last week on the tower of Shelton Church, Staffordshire, deserves notice on account of its being, it is said, the largest in England. The pole is the trunk of a Russian larch 65ft. high, &c."

This may possibly be the longest flagstaff on a church tower; otherwise the dimension is not great. A flagstaff has just been erected in Sefton Park, near this town, 123ft. high, all one pole, being nearly as long again as the one at Shelton.—I am, &c., J. SIRETT BROWN.
58, Chatham-street, Liverpool, May 31st, 1879.

Intercommunication.

QUESTIONS.

[5786].—**Edington Church.**—In your last number (p. 618), it is stated that "the parish church of St. George, Edington, has been entirely rebuilt." I beg to inquire if the building destroyed was the very interesting church erected by Bishop Edington, the predecessor at Winchester, of William of Wykeham. It appears to me that it is so, and hence a valuable stepping-stone in the history of English architecture is lost for ever.—W. P.

[5787].—**Strains in Collar-Beam Roof.**—Will one of your kind correspondents show, by means of a diagram, the strains which come upon a rafter, the collar, and the supporting walls of an ordinary span roof, having its collars fixed so that one-third of the length of the rafter is below them; no tie-beams nor purlins.—S.

[5788].—**Ormolu.**—Can I be referred to any work which explains the original manufacture of this material? All the modern imitations rust or become black in a short time, because lacquered. I have been informed that the old work was plated with gold, or, at least, was well gilt, and hence it keeps clean and bright.—W. P.

[5789].—**Licences and Stamps.**—Is it necessary for an architect-surveyor who is occasionally employed to estimate the value of dilapidations as between the parties concerned, also to measure up and value work done by builders on measure and value also to value house and land for mortgages, to take out a licence? And secondly, does the account of measure and value or report on dilapidations made to the parties require an appraisal stamp?—W. V.

[5790].—**Quantity Surveying.**—Will some correspondent please give the average time in taking off, abstracting, and bringing into rough draft bill of quantities for an average brick job, with stone dressings, for about a £5,000 contract—in hours preferred?—G. W.

[5791].—**Water Exuding from Verandah.**—I should be much obliged if some scientific man would explain the following:—I built a verandah to a house near the seaside about a year ago, and now every day when the sun shines water drops from every exit in the boarding underneath and at the eaves. It is plain tiled and boarded on top of the rafters with wellings, shutes, &c. There are two gables. It does not drop except when the sun is hot or even during rain. The weather has been alternately wet and fine every few days, and warm.—R. G. P.

[5792].—**Manufacturers' Catalogues.**—Will any of the readers of the BUILDING NEWS kindly inform me as to the best method of keeping manufacturers' catalogues so as to be of easy reference in the office? One difficulty I find is the different sizes, another is the variety of forms; some are bound, some half bound, some in pamphlet form, and some simply sheets. Any suggestions on the subject will oblige.—INQUIRER.

[5793].—**Fountain Basin.**—I shall be obliged to any one who will give me information as to the best way of jointing and forming bottom to a marble basin for fountain, size 6ft. 6in. over all, with base in centre for fountain, 2ft. 6in. diameter, water-line to be 6ft. above floor line, and depth of water about 15in. I am aware it would be well to have it cut out of a solid piece, but as it would require a block of about 105ft. cube, the cost would be too great. A section from some of your readers would be of service.—SERIA.

REPLIES.

[5772].—**Red and White Wood.**—In reply to "Kippax," red, or otherwise called yellow deal, can be distinguished from white deal by a variety of ways, which are the result of the component constituents of each being in some respects quite different. Red or yellow deal is a resinous wood, giving it the quality which so effectually resists the action of damp, and renders it useful for external work exposed to the weather, being *Pinus sylvestris*, growing in districts of suitable soil and climate, frequently on sandy soil, and when cut it is somewhat close grained, especially on the end, and in no wise harsh in appearance nor touch, its knots are but very seldom loose, and are of a rich reddish colour, and as the timber seasons the knots will not much project beyond the wood. The end of a new yellow deal is smooth and reddish, and may thereby be known from the end of a white one without any close inspection. The annular rings on the grain when cut endwise do not prominently appear, because the intervening spongy pith contains so much resin as to prevent its crumbling away from the rings or shrinking away

from them, and the same characteristics hold good with respect to the grain cut lengthwise, the intervening spongy pith and the annular rings adhering closely to each other by means of the resin, and in consequence it does not split so very easily, and it is also softer than white deal, and its scent is not strongly perceptible. When sawn or planed it has a dullish look, and is almost entirely deficient in reflective brilliancy, and there will not be turpentine discoverable in or on it; but with respect to colour, its annular rings are usually strongly marked by being of a darkish orange colour, but otherwise the wood itself is sometimes of a very light yellow, which might be well depicted by a light wash of raw sienna, with perhaps burnt sienna or umber for annular rings. Its medullary rays are hardly discernible, and consequently it has no noticeable silver grain or figure. Memel timber is of the foregoing kind, and *Pinus sylvestris* also comprises Riga fir, Danzig fir, and Onega, Yellow Archangel, Wyburg, Gefle, &c., and it is the Scotch fir of Britain. The Onega is very hard, tough, and durable, and good for warehouse floors. Danzig is knotty and tough, Riga is the largest timber, Memel the strongest red deal. *Pinus sylvestris* grows farther north than any tree but the dwarf birch. The pale yellow Swedish *Pinus sylvestris* is very cheap and inferior. The best red deal should be strongly marked, red and heavy. *Pinus abies* or *Abies excelsa*, or commonly called Norway spruce, is that which is otherwise called white deal, and there are many varieties of it, some of that growing in America being black, some red, and some hemlock spruce. The kinds in use in this country are mostly Christiana white, Petersburg white, and Riga white. Christiana is usually preferred, but the best of the other kinds are excellent. There are four different qualities of each kind recognised. White deals, if uncut, may be known at once by observing the grain at the ends. If the ends have a rough sort of appearance and of an almost indescribable colour, and the annular rings stand out in appearance as sharp and thin as the back of a knife, and with the intervening pith wood between rings sunken and crumbled and gone to some extent, then no doubt need to be entertained but what it is spruce; and looking at it flatwise it will be of smoothlike glossiness in places, even though it is rough from the saw, and is harsh and slippery to the sense of touch. Its knots are generally darkish and frequently loose, and, like their wood, are excessively harsh in appearance, and the wood shrinks from the knots and leaves them standing up in relief on the surface. The spruce also contains much turpentine, which may be seen at times running in streams over the boards if exposed newly cut to the weather. When planed it has a silky shining appearance, and if it were not so common because cheap it would be considered a beautiful wood when polished, that is, if perfectly seasoned and coated to prevent the grain from rising. If exposed to the atmosphere and to water, the annular rings will, on the flat way of the grain, rise, or the other wood will wear away from between and leave them standing up as so many sharp ridges. Spruce is unfit for work exposed to the weather, and it smells of turpentine strongly. There are yet other kinds of pine used in this country, and to be sure of knowing one kind one should know all. There is the *Pinus strobus*, or American white pine, and which is one of the kinds usually called pine by practical builders and timber merchants. We call it yellow pine, and it differs from the *Pinus abies* principally by the entire absence of tendency of the annular rings to project beyond the wood, either on the end or on the face, and in the medullary rays being more discernible; and in some kinds at the least, if the timber be cut with a medullary ray on its face the wood will then show small silver grain or figure, somewhat similar to silver grain in sycamore, in maple, in beech, and in Spanish mahogany, &c., and which, by the bye, is the criterion whereby Spanish mahogany may be told from a good sample of Honduras or Cuba mahogany. The *Pinus strobus* is white in colour American. There is also the *Pinus mitis* and the *Pinus palustris*, each being American yellow pine (we call them red), and not dissimilar, except in colour, to the *Pinus strobus*. They are heavier than the *Pinus strobus*, and very strong and elastic. Then there is the Canadian *Pinus resinosa*, or pitch pine, being a heavy strong red pine, but having the annular rings as with the other pines not projecting. It is of considerable size. It is much heavier than any Baltic timber. It is worthy of notice that the heaviest American red pine does not equal in weight, average for average, the lightest Baltic red deal. Now the American pines, except the pitch pine, have very much turpentine in them, and from the red *Pinus palustris* the Americans get the most of their tar and turpentine. In conclusion, it may be remarked that yellow deal, especially when wet, may be known by its dark bluish indigo colour sap wood, the sap in the white deal being hardly discernible. The Memel is the strongest of the red deals, but the Norway spruce is immensely superior in tensile strength, and the best red American pine is stronger than Baltic red deal. Norway spars are used for ladders. Pitch pine is not so strong in tension as Norway spruce, but in compression it is immensely strong, and which in a beam will raise high the neutral axis; and consequently a pitch pine beam is almost as strong as English or Canadian oak, and much stronger than Danzig or Adriatic oak. Norway spruce is very tough and elastic, and red pine is even much more elastic. —HENRY AMBROSE.

[5772].—Red and White Wood.—This question has been answered before in the BUILDING NEWS. Red wood, as that of the Northern pine (*Pinus sylvestris*), is of a reddish yellow, but of such different degrees of brightness that as far as this quality alone goes it may be mistaken. The annular rings are narrow, of a reddish colour. White fir or spruce is of a yellowish-white colour, the rings are well defined and the surface is glossy in parts. It is more knotty, and the sapwood is not easily distinguished. But no description can adequately make the difference between the two thoroughly understood. —G. H. G.

[5773].—Lime.—On p. 619, H. Ambrose says:—"Poor limes contain no alumina, but insoluble silica." I think the writer has made a mistake, for "poor" or "meagre" lime is the term generally used for hydraulic lime, which name it obtains from its inability to increase much in bulk when slaking. Therefore if poor lime is hydraulic lime it must contain both silica and alumina, that is common clay combined in certain proportions. —J. S. GOLDTHORP.

[5774].—Thrust of Arches.—First with respect to the piers: these must have a foundation such as will most

certainly safely sustain the 50 tons; but I doubt whether with heavy wet snow and such a violent storm of wind as on March 2nd, 1878, pressing on the roof, and with the possibility of the upper floors being utilised in perhaps one or two adjoining houses as depositories for part of the stock or appliances used in the business carried on, as, for instance, say, the enormously heavy type racks of a printer stood as near to the light as he could get them, or perhaps a stationer, with his heavy reams of paper, &c. In such a case it might be easy to have 100 tons on a pier, and which, according to rule, should be capable to support 10 times its safe load, and the 100 tons, or, say no more than 50 tons, would give us 500 to 1,000 tons as a crushing load. Now stock bricks in lias lime are reputed to fail with 17 tons on a foot superficial, and to entirely crush with 27 tons on a foot when only a foot high, but 12ft. high would render them much weaker still, as in that case they would not wait till they were being crushed, but would vertically crack, and bulge bodily out from the party walls, and let all down depending on them. Therefore we revert to one-tenth of the crushing weight as the safe load; and it is considered that under such conditions the height may be ten times the diameter or thickness of pier, and therefore two tons per foot super will be the utmost we can safely calculate on, and we have 3ft. super on our pier of 2ft. by 1ft. 6in., which will safely carry, say, 6 tons, and no more. Gault bricks and real Portland cement, and the utmost precaution being taken to have the strongest cement, which one must see to himself and know how to test it, and the men being watched during every minute of the time the piers are being built, otherwise they might use mortar in the place of cement if the cement ran short, just for a few courses, or mix sand with the cement, under the erroneous idea that sand will strengthen the cement. Sand strengthens, in due proportion, lias lime, but weakens cement. Then with gault bricks and the best Portland cement such a pier would support (if its foundation would) from 12 to 18 tons, but we have from 50 to 100 to support; and therefore there are but two convenient practical ways: the one, to build into the party wall a properly cast iron stanchion of sufficient area to support the number of tons at so many times its diameter. If more than six times its least diameter it begins to diminish in strength, and at twelve times would require more metal to retain the same strength. Rule for iron columns and standards thus:—Columns and standards of similar ratios of length to diameter, and having similar sections in proportion the one to the other, are to one another in strength as the direct ratio of the squares of their lengths, and from which, if time would allow, we could deduce formulæ and examples, but we may say that above 45in. in sectional area of a column or standard would properly support the weight in question if on a proper foundation and properly fixed with felt or lead or pine or other means to prevent fracture, and the soundness and excellency of the material being guaranteed by a trustworthy founder, and the verticality of its axis tested while they are fixing it, as it will not do to trust to instructions alone without seeing that they are carried out fully. Hard stone ashlar would be the other method. With respect to the abutments for arches, an arch of 18ft. span and 1ft. versed sine would exert a thrust thus: If half the span (in our case 18 ft.) divided by 2 feet be made radius, then as its radius is to its tangent—that is, supposing it is sufficiently loaded, and as our radius is 9 and the degrees give tangent equal 1ft., then we shall have 9 times the thrust on abutment that we have weight at crown of arch, and if we have, say, 100 tons on the pier, then take 50 as bearing on the crown of arch—i.e., as a load equally distributed and 9 times 50 = 450 tons to resist, or, if we say 50 tons on the pier then 225 tons on the abutment will be the thrust. As we can safely give 5 tons strain in tension on 1in. square of wrought iron we should require from 45 to 90 square inches of wrought-iron ties to hold in our end abutments, but such would be preposterous and the most unskillful way of going to work, because our arch, if it would in itself bear its pressure, would do nothing to counteract its effect on the tie-rods underneath it. The proper way to go to work would be the usual way—viz., to put a proper riveted girder where the web and stiffeners will counteract the tensile strain by the adhesion of the flange in compression where one cannot break until the other does, and which would effect a great saving in metal. And, again, if an arch were adopted it should not rise less than 1in. to 1ft., which would give 2ft. 3in. rise, but an arch with much work to do should rise 1/3 of its span, which would give 6ft. rise; and again, there is a place for everything, and an arch of long span over a shop front I should think must look very unattractive, and tend to depress the height of the top ash and exclude light, and to render high the window sills above. —HENRY AMBROSE.

[5782].—Right of Access.—In reply to "X. Y.," it may perhaps be considered that in the first place, supposing the steps to be fixed by any of the following methods—viz., by digging into the ground for the purpose of receiving a foundation or supporter to steps, or if the steps have been cemented to the original building, or some positive part thereof, by mortar, or united by nails or otherwise, to some erection previously attached to the ground, then if the steps have been or are fixed by any of the above methods the tenant or lessee cannot remove them without permission of his landlord, and which he should obtain in writing, and if the tenant should remove them then he would be liable to an action for dilapidations; but if the lessee fixed same with lessor's permission, given and obtained with the view to their being used for the purpose of the lessee's trade or calling, in this case the lessee would possess the privilege to remove them at any time previous to his giving up possession of the premises; and in the latter case the lessee can also remove them at any time during his tenancy and erect something else in their place, but in any of the preceding cases he will be required to make good any injury or damage his fixtures may have caused before the termination of his occupancy, but the preceding has supposed that the lessee carries on a trade or business on the premises; but if he does not, then he can remove nothing without permission by the landlord, and as a general rule the tenant can remove nothing whatever that is affixed to the freehold or any part of the same, and which is therefore a constituent part thereof, and cannot be removed by the tenant without leave of the landlord or reversioner, and that which he is privileged to fix and remove must not be fixed with nails nor let into the ground without permission, and permission for its removal should likewise be obtained before using same. If

the ground the steps stand on was not included in the tenement as an easement, either by being specially mentioned or else by having for 20 years been included in the same tenement or freehold, then the lessee would have been trespassing by placing the steps there if the ground belongs to the lessor as private property unless the lessor gave his permission for the steps to be placed there, and if so, and no time was mentioned, then it would evidently be during his pleasure; he having the privilege of access to the ground, could of course claim same at any time, because an agreement cannot legally be broken and still hold good, and for a lessor to let premises in lieu of a consideration of so much a year; that agreement cannot be altered without being broken and a new and supplementary one entered into in its stead, and it is manifest that a new agreement could leave no cause of dispute involving the old one, and therefore whether the lessee did or did not have permission to put steps on his landlord's ground, if he moves then he can have no right to the ground because his steps had stood on same, but only if the landlord had specially let him that piece of ground for a consideration. And, lastly, the lessee cannot claim the ground after a lapse of time which he cannot make good his claim to at the present time unless the landlord should have entered into a contract with the would-be lessee that he would let it to him so that his occupancy should commence at a certain date, and in this last case, if the landlord failed to keep his contract then the would-be lessee would have a remedy by action for damages sustained by him through the breach and non-fulfilment of the contract to let entered into by the landlord. —HENRY AMBROSE.

[5784].—Discharge of Water.—There are two formulæ in general use for calculating the discharge of pipes running full, the Dutch and the Irish. The former, known as Eytelwein's, is not so correct under varying circumstances as the latter, known as Neville's.

g = Supply in gallons per minute.

d = Diameter in inches.

r = Hydraulic mean depth in feet, that is the quotient of section by perimeter.

s = Sine of inclination or quotient of head by length.

$g = 2.04 d^2 \left[140 \sqrt{rs} - 11 \frac{3}{4} \sqrt{rs} \right]$ Neville's formula.

$g = 28 \sqrt{d^5 s}$ Eytelwein's formula.

It is preferred to calculate the discharge in feet per minute; recollect that a cubic foot contains 6.24 gallons. In the case in question—

g is unknown

$d = 20$

$r = 9/12$

$s = 3/36$

The rest is obvious.—OLD WATERWORKS.

LEGAL INTELLIGENCE.

ARCHITECTS' COMMISSION.—Ingram and Holland v. Mark Cockle.—This action was tried in the Court of Common Pleas on Monday and Tuesday week, the 26th and 27th May, before Lord Denman and a common jury. It appeared that in the early part of 1878, the defendant purchased the Centurion public-house in the Broadway, Deptford, of a Mr. Cole, who had at that time engaged the plaintiffs to negotiate an extension of the lease of the house from the Bridge House Estates Committee of the City Corporation, and, if successful, they were to be employed as architects in the re-erection of the house at the usual commission of 5 per cent. The defendant appeared to have taken a transfer of this arrangement as part of his bargain, or as he expressed it, he was "to stand in Cole's shoes." Subsequently the new lease was obtained, and plans were prepared for building the new house; but, according to the defendant's case, plaintiffs delayed the completion of the plans until the winter season prevented the erection of the house in that year. They moreover, against, as it was maintained, the wish of the defendant, insisted on taking out the quantities of the new building and sought to introduce a builder of their own nomination instead of a local builder who was preferred by Cockle, and these disputes ended in an angry interview on the 7th of October last, when the plaintiffs intimated to the defendant that as he seemed so much dissatisfied he had better pay their fees and go to some other surveyor. This advice the defendant took so far as to instruct Mr. W. T. Hunt, of New Cross-road, to prepare fresh plans and specifications of the proposed work (which is now being carried out by Mr. Hunt) and to tender to the plaintiffs a nominal sum as compensation for the services rendered. This was refused by them, and the action was brought to recover £200 as commission at the rate of 5 per cent. on the estimated cost of the new building, and £80, or 2 per cent. for taking out the quantities, in all £280. The evidence was of a conflicting nature as to the original agreements between the parties and as to the interview on the 7th October, when the arrangement came to an end, and as to whether the plaintiffs discharged themselves or were discharged by the defendant, also in either case as to the amount they would be entitled to under the peculiar circumstances, the plaintiffs having retained the whole of their drawings and specifications. Mr. Hunt was called to prove that he had prepared entirely fresh drawings, irrespective of those of the plaintiffs, and that he had had no assistance from them nor any advantage from the work which they had performed. The defendant's counsel contended that this being the case, and the plaintiffs by their dilatoriness having caused the defendant great loss through the delay in proceeding with the erection of the new house, and having, as he contended, discharged themselves, they were only entitled to recover a nominal sum, or, at any

rate, no more than the sum paid into Court, £50. After hearing the evidence, which occupied two days, and the very clear summing up of the judge, the jury awarded the sum of £160, being £100 for the preparation of plans, &c., and £60 for the quantities.

Our Office Table.

THE annual meeting of the Sanitary Institute of Great Britain was held on Thursday week, at the rooms of the Society of Arts. Dr. B. W. Richardson was in the chair. The report showed that four examinations have been held, under the direction of the Council, for local surveyors and inspectors of nuisances. Twenty-six candidates had presented themselves, of whom 12 wished to obtain certificates of competence as local surveyors, and 14 certificates as inspectors of nuisances. Five surveyors and 13 inspectors of nuisances had gained certificates, and seven surveyors and one inspector of nuisances had failed to satisfy the examiners. Sixteen candidates had expressed an intention to present themselves for the next examination in June. A discussion arose on a resolution, which Sir Antonio Brady had given notice he should propose, to alter the first by-law, so as to make women admissible as associates, members, and fellows of the Institute. Sir Antonio Brady was not present, and though his resolution was supported by several gentlemen, including Dr. Richardson, it was rejected on a show of hands. On the motion of Dr. Lory Marsh, who was supported by Dr. Russell, of Edinburgh, and Captain Douglas Galton, a resolution was carried suggesting that the Council should proceed with as little delay as possible to carry out that part of the basis of constitution which related to the establishment of a school and classes for the technical teaching of sanitary science.

MR. JAMES HODGES, C.E., the contracting engineer and agent, under the late Mr. Robert Stephenson, of the famous Great Victoria Bridge over the river St. Lawrence, at Montreal, which was opened by the Prince of Wales on the 25th of August, 1860, died at his residence at Perry-hill, Bagshot, on the 28th ult. Mr. Hodges, who was in his sixty-sixth year, was born at Queenborough, Kent, and from 1839 till 1841 was assistant-engineer to the late Sir William Cubitt, at Dover, where he had charge of the tunnels and cliff works of the South-Eastern Railway and of the great blast of the Rounddown Cliff. From 1841 to 1843 he was resident engineer, in Norfolk, for the railway works under Messrs. Robert Stephenson and George Parker Bidder, and constructed the new harbour at Lowestoft. He proceeded to Canada in 1859, as engineer for Messrs. Peto, Brassey and Betts, and constructed several hundred miles of the Grand Trunk Railway, including the celebrated bridge above mentioned. This great work, which connects Canada with the seaboard States of North America, is two English miles long, less about 60 yards, or about seven and a half times longer than Waterloo-bridge. It is supported on twenty-four massive piers, and is 60ft. above the summer level of the river, the cost of erection being £1,700,000.

We have received from Mr. John Hogg, of Paternoster-row, a selection of Mr. F. Soenneken's productions for facilitating writing, which are worth notice. A text-book of "Round Writing"—a system of calligraphy which its inventor particularly recommends to architects and others, some pens specially adapted to execute the same, which seem well suited to their purpose; some other pens for rapid writing, about which we can speak with more confidence, being among the best we have ever tried; a pen-holder made on a new principle for use therewith, which though very light, strikes us as being too thick, and a "writing and drawing instrument" which is quite a curiosity in its way, by means of which the nine pens sold with it, 144 different double, and 504 different triple lines may be executed. Very little practice would we should think render this last named instrument a most useful one in the hands of a draughtsman or ornamental writer.

At the meeting of the Metropolitan Board of Works on Friday, the election of district surveyor for Putney and Roehampton, in place of the late Mr. Horace Field, took place. The candi-

dates were twenty-six in number, but one, H. H. Bridgeman, was struck out of the list of those to be voted upon, on account of non-appearance at the precise time of election. The candidates were first reduced to six by a single vote, and then a series of votes were taken, the lowest on the poll being successively struck off. The following was the order of voting, the names of the candidate struck off at each voting being indicated by an asterisk. Preliminary vote: J. B. Badcock, 4; C. W. Brooks, 11; R. H. Burden, 6; E. Carritt, 17; A. Conder, 13; J. S. Edmeston, 14; J. M. Ferguson, 9; F. Hammond, 21; E. R. Hewitt, 0; J. W. James, 20; W. A. Large, 14; H. Lovegrove, 14; F. C. Notley, 14; Alex. Payne, 27; J. S. Quilter, 5; W. Smallpiece, 7; T. Stone, 6; E. Street, 22; W. Tasker, 23; F. Todd, 10; J. Goldicott Turner, 10; T. Williams, 17; T. W. Willis, 27; and J. Young, 14. 2nd vote: Hammond,* 16; James, 17; Payne, 22; Street, 17; Tasker, 19; Willis, 26. 3rd vote: James,* 11; Payne, 21; Street, 17; Tasker, 19; Willis, 26. 4th vote: Payne, 22; Street,* 10; Tasker, 18; Willis, 25. 5th vote: Payne, 23; Tasker,* 16; Willis, 24. Final vote: Payne, 17; Willis, 26. Mr. Willis has, therefore, been elected. It was agreed to advance the following loans to local authorities in the metropolis: Holborn District Board, £16,000, for re-creation of new offices; Hackney District Board, £10,000, for paving works; Vestry of St. George the Martyr, Southwark, £6,500, to defray cost of paving works; Chelsea Vestry, £1,400, to defray cost of erecting public offices and mortuary at Kensal-road; St. Marylebone Guardians, £40,000, towards cost of infirmary in course of erection at Notting-hill; Holborn Guardians, £25,000, for building of infirmary at Highgate; and Rotherhithe Commissioners of Baths and Washhouses £1,500, for purchasing leasehold interest in ground on which it is proposed to erect baths and washhouses. Mr. Robert Taylor brought forward the disastrous floods which were occasioned on the previous day in Lambeth and Southwark, which he attributed to the unexpected rainfall and to the defective sewerage of the South of London, and the whole question was referred to the Works Committee for consideration and report.

MR. HENRY LEIGHTON, of the Grange, Lambton Park, has died, at the age of 63 years. The deceased gentleman commenced his career at Ravensworth Castle, where he was engaged eight years. Having removed to Newcastle, he was employed on several important public works, including St. Mary's Catholic Cathedral for two years, and for some time he was at Carpen, Lancashire. Returning to Newcastle, he acted as inspector of the Church of St. Mary, Rye Hill, and on the completion of that edifice he entered the offices of the late John Dobson, architect, who placed the Hexham Town Hall, also the Hayhole Dock, with several other important works under his care. Mr. Dobson ultimately placed him as manager and inspector of the building of Lambton Castle, and after the death of Mr. Dobson Sir Sidney Smirke, R.A., retained him as his inspector. Mr. Leighton also held the situation of architect to the estates of the Earl of Durham, and inspected the progress of the building of Fenton House, near Wooler, the Northumberland residence of the Earl of Durham.

SOME time since the Vestry of Paddington came to the sensible resolution to abolish the contract system as regards dusting, slopping, and watering, and to do the work themselves. For this purpose they purchased wharves, horses, and plant, but have since found that they had not secured any place in which to deposit the breeze until it is purchased by brickmakers. The subject was referred to the general purposes committee of the Vestry, who reported on Tuesday, recommending the purchase of a piece of land at Alperston on the banks of the Grand Junction Canal, the price not to exceed £3,200. In moving the adoption of this report, Mr. Flood asserted that there exists a combination of contractors to endeavour to prevent the vestry selling the breeze to the brickmakers, and said that it was essentially necessary that the vestry should purchase the land, so as to be put in a position to compete with the contractors. A discussion of some hours' duration ensued, the opposition contending that it would be far better to sell the breeze to the contractors, but eventually the motion was carried by 31 to 19 votes, and the vestry will therefore apply to the Metropolitan Board of Works for a loan of the sum required.

It is proposed to hold an ecclesiastical art exhibition in London during May and June, 1880. It will be open to British and foreign art. The first division will comprise a loan collection of Medieval and modern ecclesiastical art; the second division will be reserved for architects, artists, and others who exhibit original work; and in the third division will be exhibited works of manufacturers. Amongst the principal classes will be pictures for churches (schools various); cartoons for wall paintings, mosaics; architectural drawings; cartoons for stained glass; mosaics; sculpture; illuminations; stained glass; wood and ivory carving; bells; embroidery, tapestry, and textile fabrics; missals; heraldry and sacred symbolism; metal work; tiles; models of churches (ancient and modern); and what is classified under the head of funeral reform, Christian and sanitary. The Secretary, *pro tem.*, is Mr. John Bray, and the offices are at 125, Fleet-street, E.C.

SATURDAY last was a high day and holiday for the residents of Bedford Park, or Bedford Village as it should have been called, at Chiswick. The foundation-stone of the new church in course of erection was laid with the usual ceremony by Earl Nelson. We have already fully illustrated the design,* which is a characteristic combination of Late Gothic and so-called Queen Anne detail, the architect being Mr. R. Norman Shaw, R.A., whose picturesque and convenient houses have rendered the "Village" so much sought after by artists and artistic people, there being about 100 families already located on the estate. After the ceremony of laying the foundation-stone, under which a copy of our illustrations of the building with other reports and papers were secreted, a public luncheon was held at the Bedford Park Club, under the presidency of Earl Nelson, and about 150 persons sat down, including many of the local clergy and interested laity and several well-known men in the literary and art world in London. The Queen Anne style for a church was approvingly remarked upon by the chairman as being associated with a period of the history of the English Church to which Churchmen had reason to refer with pride and pleasure; and in a short speech Mr. Norman Shaw promised, on the occasion of opening the church, that he would give an account more at length of the Queen Anne style. The proprietor of Bedford Park, in responding to the toast of "Prosperity to the Estate," dwelt upon the difficulties with which he, as a novice in building matters, had had to contend since the commencement of the estate, now rather more than two years ago. By no means the least of these difficulties were due to the thorough hatred which he found existed between the ordinary speculative builder and the architect on the one hand and between the ordinary lawyer and both the former individuals on the other. Castles in the air were often nothing to the after-dinner dreams in which the speaker had sometimes indulged, during the midst of which probably the rude announcement would break in upon his reverie with commonplace reality that the boiler at No. 9 had burst, or that similar fate had visited the water-pipes at No. 2. But looking at what had already been accomplished since the starting he had nothing to fear that the original scheme would be fully realised. After the luncheon many visitors amused themselves in inspecting the buildings and houses in course of erection.

THE (American) *Plumber and Sanitary Engineer* suggests to life insurance companies that instead of merely hammering at a man's chest to find if he has a tendency to any disease, would it not be well for the medical examiners of life insurance companies to inquire if he has not got a cesspool leaking into his well, or untrapped pipes beneath his basins and closets? More persons die of zymotic diseases than from almost any other malady, yet a man living in the midst of contagious influences, and hence daily liable to take diphtheria or typhoid fever, would yet find little trouble in getting a heavy policy on his life. If insurance officers would give this subject their attention they might save many losses to their companies, and also benefit the public generally; for if men found that their homes were rated as "hazardous," they would soon begin to think of finding a remedy for the difficulty.

* See BUILDING NEWS, January 17th, 24th, and 31st, 1879.

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CHIPS.

The memorial stone of a new coffee-house was laid last week at Bangor. The cost will be about £1,500. Mr. Richard Davies, of Bangor, is the architect, and Mr. E. Williams, of Garth, the builder.

A Transatlantic sanitary engineer, in his report on some highway improvements and repairs recently stated regarding a point on the route near a small stream of water that "it was a good place to put down a culvert!"

On Saturday afternoon the memorial stones of a new Wesleyan Methodist Chapel were laid at Newton Heath. The design is modern Gothic, and it will be built of brick, faced with Burnley parpoints, with Halifax stone dressings. It will have a stone spire rising to the height of 130ft. There will be three vestries. The chapel is designed to seat 850 persons. The cost is £8,500. Mr. A. W. Smith, of Manchester, is the architect, and Mr. Henry Brown, of Hollinwood, the builder.

Lord Wolverton has been making great improvement in his kennels at Iwerne-Minster. Claridge's patent asphalt has been laid to all the kennel floors and approaches, with a view of rendering them watertight, which is so essential a matter for hound's feet. The work has been entrusted to Messrs. G. Smith and Co., of London.

A new Wesleyan Chapel was opened at Askerne last week. Mr. Jno. Wells, of Derby, is the architect; and the chapel has been built by Mr. Perry, of Castleford. There is accommodation for nearly 400 persons, and a school has been built at the back for 100 children, with other offices.

The Inter-oceanic Congress has adopted, by 89 votes against 8, the proposal in favour of cutting the canal through the Isthmus of Panama.

Thorton Church, Norfolk, is about to undergo a thorough restoration. Sir Reginald Proctor Beauchamp, Bart., repairs the chancel at his own expense, and the funds for the nave are being collected by the vicar, the Rev. C. B. Ratcliffe. The plans have been drawn out by Mr. Herbert Green, architect, of Norwich.

The Wilts Archaeological Society have arranged to hold a three days' congress at Marlborough, on Tuesday, Wednesday, and Thursday, the 12th, 13th, and 14th August. Marlborough will be visited on the opening day, and the programme for the second day includes a visit to Ouse-hill, Wans' Dyke, the earthworks at Hurst and Saverne House, and on the closing day Rockley, Barbury Castle, Avebury, and Silbury will be visited.

A parochial industrial exhibition was opened in the schoolrooms of the Church of St. John the Divine, Camberwell-new-road, on Tuesday. The exhibition is one of the first of the kind held in the metropolis, and has been divided into two sections, one open to persons of all ages residing in the parish, and the other to children under education in any school in the parish. In the first section there are 10 classes, including specimens of models, carving, turning, furniture, inventions, and designs, paintings, penmanship, and illumination, needlework and fauery-work, shown by some 160 exhibitors. The second-class includes 13 classes, with 200 exhibitors of models, carving, drawings, paintings, maps, knitting, needlework, &c.

Mr. Joseph Storey, who was last year returned by St. Luke's Vestry as their representative on the Metropolitan Board of Works, but whom that body unavailingly requested to resign on account of certain business transactions in reference to the Golden-lane improvement, has at length resigned his seat at the latter body, having failed to obtain re-election to the vestry.

A correspondent of the *City Press* calls attention to the desirability of furnishing the four vacant pedestals at each corner of Blackfriars-bridge with colossal statues of some kind, in order to complete the original design, and points out that the Bridge House Estates Committee of the Corporation have surplus moneys in hand from the fund appropriated to the construction of the bridge, a portion of which should be applied to this purpose.

The third annual Fine Art Exhibition was opened in the Albert Institute Buildings, at Dundee, on Saturday, by Sir Daniel Macnee, P.R.S.A. The present is the largest display of pictures yet made in Dundee: 335 are hung on the walls, and between 200 and 300 were rejected. In the lecture hall of the free library, a supplementary industrial exhibition is being held.

On Sunday week a new Roman Catholic Cathedral in New York, situated in South-avenue, between Fifty-first and Fifty-second-streets, was dedicated by Cardinal McClosky. The corner-stone of the cathedral was laid in 1858, and it has been built at a cost of 4,600,000 dollars; it is entirely constructed of white marble, and measures 334ft. long and 174ft. broad; there are two spires, each 334ft. in height.

A month since the Malton Local Board of Health appointed a Mr. J. F. Buckham from a list of 130 applicants to the combined offices of road surveyor, nuisance inspector, and inspector of buildings, and the Local Government Board has since confirmed the appointment. On Wednesday week the clerk reported that they had "come to a dead-lock, as the surveyor appointed was not able to make his appearance at the time specified, and he was now so poorly as to be unable to attend to business." A discussion on the cause of the new official's illness led to a motion being made, "That Buckham be dismissed in consequence of certain irregularities which have come to our notice." An amendment that he be allowed to resign was proposed; but the original motion was carried, and the members of the board will, a second time within two months, have the privilege of selecting an officer.

The foundation-stone of the permanent church of All Hallows, Southwark, was laid on Wednesday. The church will accommodate 1,200 persons, and will cost about £10,000. It is of the Middle Pointed style, and is being erected from the designs of Mr. Gilbert Scott, M.A., F.S.A. The builder is Mr. Higgins.

An exhibition of oil and water colours was opened at the Academy of Arts, Milsom-street, Bath, on Tuesday.

A new Primitive Methodist Chapel, seating 1,000 persons, was opened at Blacnavor on Sunday.

We are desired to state that the gratings for St. George's Cathedral, and illustrated in our last issue, were not executed, as stated, by Messrs. Farmer and Brindley, but by Messrs. James Stevenson, of the Darlington Works, Southwark-street, who presented them to the church. The models only were prepared by Messrs. Farmer and Co.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. Paper by Edward P. Anson on "Recent Excavations of the Roman Forum," 8 p.m.

Society of Engineers. Paper by Charles T. Alford on "The Mineralogy of the Island of Sardinia," 7.30 p.m.

FRIDAY.—Royal Institution. F. J. Bramwell on "The Thunderer Gun Explosion," 9 p.m.

SATURDAY.—Royal Architectural Museum Sketching Club. Excursion to Stone Church, Kent.

Trade News.

WAGES MOVEMENT.

SWEDEN.—A strike among the men employed at the saw-mills at and near Sundswall began on Tuesday, the 27th ult., owing to the refusal of a demand for higher wages. It now extends to 19 saw works and 5,000 workmen, and is still increasing.

THE SLATE TRADE IN NORTH WALES AND IN AMERICA.—Mr. W. J. Parry, the president of the North Wales Quarrymen's Union, who is travelling in America and Canada seeking the best field for the employment of the unionists who have been assisted to emigrate, owing to the stagnation of the slate trade, has forwarded to the Executive Council of the Quarrymen's Union a lengthy report, in which he expresses his conviction that it is useless for common labourers or quarrymen to go to America to seek work in the slate-quarries, wages being extremely low, and work difficult to be had even at that low rate of wages. The condition of the American quarryman he describes as being miserable, the wages of labourers averaging 4d. per hour, and those of quarrymen 6d.; but many of them, owing to the severity of the weather, have been unable to earn anything for three, four, or even five months. One of the matters which excited his surprise was to find that the Welsh were rapidly losing their hold of the art of slate-working, and that comparatively few Welshmen were now employed in the American quarries. He recommends intending emigrants to turn their attention to agriculture.

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THE BUILDING NEWS.

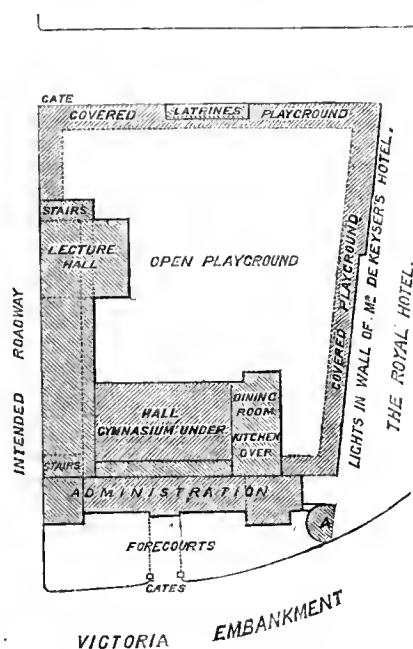
LONDON, FRIDAY, JUNE 13, 1879.

THE CITY OF LONDON SCHOOL COMPETITION.

WE are able to give some further information respecting the above competition this week. We wish we could have announced that the committee had seen fit to withdraw the unwise restriction placed upon the exhibition of the designs, and had called in the services of a professional referee, as in simple justice to the competitors they were bound to do. Strange to say, the members of the committee and their officials individually profess perfect willingness that the designs should be seen by the representatives of the professional Press, but as a body they decline! They have, of course, been unsuccessful in their attempt to keep the profession in the dark—so far, at least, as we are concerned; they have only succeeded in renouncing our criticisms of the designs to a certain degree incomplete and imperfect—the necessary consequence of our brief inspection of the plans. We appeal once more to the committee, and, failing them, to the Court of Common Council, to take the course adopted by every public body in connection with competitions, and thus put an end to the ugly rumours of unfairness and favouritism which are afloat. The building they propose to erect will probably be the type for the next generation of similar erections all over the country. Middle-class education must shortly become a leading question among those which await their solution at the hands of statesmen and social reformers; architects will presently be called upon to design the necessary buildings, and just as the first schools erected by the London School Board became examples of what to imitate and what to avoid for the rest of England, so will the building about to be put up on the Thames Embankment stand as a precedent and model for others of its kind. All the more reason, then, is there that it should be as perfect in plan and design as public criticism can make it, and that the architect entrusted with its execution is likely to prove capable of accomplishing the task entrusted to him. So far as the design placed first is concerned, there is every reason to be satisfied. The information we gave last week was correct. The authors of the design marked "Live and Learn," are Messrs. Davis and Emmanuel, of Finsbury-circus; of "Simplicity," Mr. T. Chatfield Clarke, of Bishopsgate-street; and of "Playgrounds," Mr. T. E. Knightley, of Cannon-street.

"Live and Learn" adopts a mode of distribution in the blocks which we have ventured to call the "irregular" or unsymmetrical; but as we have engraved the block plan it is unnecessary here to enter into detail. The principal entrance forms the centre of the Embankment façade, and gives access to a wide hall 19ft. wide by 15ft. in height in the "administration" block. This is mainly divided into secretaries' offices, committee and waiting-rooms on one side, and on the other into the porter's room, book-store, library, and head-master's room. These communicate with each other. We certainly like the general arrangement of this part. A corridor at the back gives access at one end to the dining-hall, and at the west end to the teaching block, which runs along the western side, by which means the administration is practically separated from the teaching apartments, while the cuisine of the establishment is placed out of

the way of the latter. Another point of architectural significance is that the administrative block forms a single-story range, allowing the large hall, which is made to form the central feature, externally to appear above it as the main block of the composition. The grouping of the recessed hall, with the lofty pavilion-like wings which form the termination of the administration block, and the towers in the inner angles, is very pleasing; while the main front is sufficiently recessed, the authors observe, to avoid building over the underground railway, and also to obtain a garden in front. In referring to the teaching block, which is located along the western side of the site facing the intended roadway, the authors observe with truth that this position secures quiet in the class and lecture-rooms, while the teaching department is kept together, and there are other considerations in connection with the adjoining hotel, as light and air, which render this side better than the eastern for this department. The head-master's rooms are at the south-west corner, and in communication as required, while the rest of the wing is occupied by 7 class-rooms adjoining each other on the ground floor—



nine on the first floor and three above. We observe the hat and cloak lobbies, one to each room, are divided from the several rooms by screens 6ft. high, and, with the class-rooms, are under control. The stairs are arranged at the ends of the teaching block, and give access to the several floors, latrines, and playground; the science department occupies the second floor, and the lecture-hall at the north end, 56ft. by 48ft., is well planned on the isacoustic principle, and has an octagon lantern light, while it is in convenient communication with the laboratory and apparatus room. The authors obtain all their class-rooms above the ground floor level, and one decided merit in the arrangement is that the plan gives a large area for covered and uncovered playground—a very important point in city schools. The hall, 90ft. by 50ft., on the first floor, forms a striking feature in this design, and is placed in immediate communication with the main entrance corridor, one flank facing the Embankment, and the other the open playground. On both sides it is pierced by a series of square-headed mullioned windows, and is lighted besides by windows at the ends, and three dormers on each side of the open timber roof. The treatment of this fea-

ture, internally, is dignified and characteristic; the authors have followed in the roof and details the Renaissance exemplified in the Prussian and Austrian schools. Five entrances are provided. Two of these give access from the class-rooms, and on the south side are three other doorways surrounded by pilasters and entablatures. A gallery is provided at the west end accessible from the staircase landing. We observe the walls are wainscoted and relieved by tablets beneath the windows, while wide hammer-beam principals of semi-Gothic character, with curved ribs, spring from pilasters against the wall. The very elaborate and carefully prepared report accompanying this design proposes foul-air outlets near and in the roof, with warmed fresh-air admission behind the wall linings, communicating with external flues at the floor level. As regards external designs, the authors have wisely selected the French Renaissance of a moderate type, avoiding the excesses of the style; the main block, the hall, and the side wings are symmetrically disposed; the hall is crowned by a high-pitched roof hipped at the ends, with a central flèche, while the advancing wings contribute to give a pleasing, well-broken, yet dignified front to the Embankment. The materials proposed are red brick, with Ancaster stone dressings and green slate roofs. One feature in the design worthy of notice is the proposition to mask the unsightly end of De Keyser's hotel by a semicircular building, which might be appropriated either to the school or to the hotel. Such are the main features of the design placed first by the Committee.

"Simplicity" is based on a central open quadrangle and cloisters, the class-rooms being disposed round on the north, east, and west sides, while the south side is taken up by the hall, which, like the last, forms an important part in the elevation, with the administration and official department in front. This distribution is essentially a Gothic one. The plan shows a rectangular disposition of the buildings, which extend all round a quadrangle about 80ft. square, cloisters with glazed openings on two stories surround this area, and afford communication, light, and air. On the east side are a masters' common-room, lavatory, stairs, and a range of class-rooms, with dining-hall above, outside which a space for tradesmen between the school and hotel is obtained; on the west side there are two blocks of class-rooms, with intervening cloak lobby, head-master's apartments, stairs, and library. Two doors close the front cloister at its ends from the side cloister; the secretaries' rooms are placed on the west side of entrance-hall, and the lavatories on the other. The administrative block in front has its own passage communication, and is well separated from the teaching department; and the dining-room and serving department are conveniently placed on the east side in the rear. At the angles of the cloisters are square rooms for hats with lift; a playground of the whole width of ground at the back by 96ft. from north to south, with covered space on the east side, is obtained. The ground plan presents in outline a rather irregular appearance on the west side from the position of the breaks; the front elevation is symmetrical in the main features, and set back from the Embankment. We have heard this design contains the largest cubical space per boy in the class-rooms, and the smallest cubical space estimating the whole of the building; but of these facts we hesitate to speak confidently. The hotel lights are not interfered with appreciably at all, owing to the space left on this side.

The author of "Playgrounds," the third design, has arranged his plan skilfully as regards the levels, keeping it away from the hotel about 50ft. The playground space is larger than either of the two former—the first having 45,000ft., the second about

21,000ft., and "Simplicity" 49,800ft. The author proposes a central hall, with class-rooms on each side. The entrance-hall has the head-master's, committee, and secretary's rooms on one side, with visitors, masters', and ladies' room, &c., on the other side. The staircase opposite entrance is a spacious one, leading to galleries and first-floor. The large hall on the ground level, with galleries accessible from the upper floor, has its walls pierced with arched openings, two of which are opposite each class-room, and by this means the side corridors, which are 10ft. wide, are lighted. The lower part of these openings are intended to be filled with ornamental sliding screens to confine the ordinary traffic to the corridors. The hall is proposed to be lighted by windows along the sides and ends. Each class-room has its screened lobby for hats and cloaks. The lecture-room is placed on the first-floor, with the other allied apartments *en suite*. The kitchen is placed on the upper floor over the dining-room, and the sanitary details have been carefully considered; every fire-place has a double flue—one half for smoke, and the other for ventilation. The author has adopted the French Renaissance of a collegiate type, and the estimated cost is £53,800, though we understand the cubing of this design has been calculated at 9d.—certainly a high figure if the covered playgrounds are included. We may here describe the general feature of a few other designs.

Last week we spoke of "Concentration," in which the great hall, 125ft. by 64ft., forms the centre, surrounded on three sides with open arched corridors. The orchestra is placed at the south end in a recess; the class rooms are arranged in pairs on the ground floor, with hat lobbies between; the dining-hall is a long apartment, occupying the rear at the west angle, while the other apartments occupy the usual positions. We note, moreover, that the science room is placed at the back of the hall, and is a rectangular apartment, with a circular roof, placed transversely, with curved seats, and the lecturer's desk in the centre of side. Class-rooms are arranged along the front, facing the embankment, not perhaps the most desirable position. We have already generally described the external elevation as being in a Renaissance style, with detail of English character. Another plan, based on the irregular system, bears the motto "Practical." The general distribution of the plan is a rectangular block, with a quadrangle in the centre, surrounded by corridors; on the south side are placed the official rooms, on the west and north sides are the class rooms, while on the east side is the great hall, lighted at the side and ends. The author considers this location the best as regards lighting, and believes a central hall objectionable, as it would be "impossible to avoid dark and ill-ventilated rooms and passages." The western side is occupied by a very long wing, extending to the end, comprising class-rooms, accessible from a long corridor, partly lighted by quadrangle, with a dining-hall at the north end, and a porter's dwelling. A large playground is obtained in the north-east portion of site, with covered ways. We observe the author sets back the east boundary of his buildings about 30ft. from the hotel. The style selected is a modification of the 13th century Gothic, which the author believes, from its simplicity of detail, well adapted for a school. Red brick, with red Mansfield stone, are suggested. We have little space left to enter into the details of this design, and must reserve further remarks. The author estimates his design at £57,000. There is also another design bearing the same motto, whose authorship we recognise at once, and to which we shall refer another time, simply saying now that it is a very good one.

Under the motto "Quis," the authors submit two plans, the chief feature of one being

a central hall with a playground beneath surrounded by corridors which communicate with four groups, and class-rooms obtained at the angles, and forming front and back blocks. The administrative department is in front, with a central hall and staircase. The official rooms are placed on the east side of entrance and the library and head-master's room are arranged *en suite* on the other side. A private corridor connects these apartments. Landing on a grand vestibule, a front corridor gives access to the great hall, the assistant masters' and class-rooms, while the two main corridors on each side of hall lead to a lecture-hall on the same axis. The laboratory and chemical department are placed on the west of the lecture-hall, with the dining-room on the opposite side. In style the authors have adopted a type of Renaissance of rather mixed character and elaborate in detail, but marked by considerable merit in the grouping. Brick and terracotta are the materials suggested; the latter is largely employed in the decorative details. An alternative Gothic design shows a lofty central tower crowned by a short spire over the entrance, while the flank side of hall is made an important feature, and has a fleche in its high-pitched roof. The second plan has a quadrangle in front, and disposes the class-rooms somewhat differently.

"Our Boys" is a design similar in its distribution of the official and teaching departments to many others we have mentioned. The school entrances on each side of the centre, and beyond the administrative apartments in front, open into corridors which surround an open quadrangle, and give access to class-rooms on both sides on the three floors. The hall and dining-room are on the ground floor, approached by the end corridor; the former has five entrances, and has a gallery, while the south bays are designed as a triforium and clerestory, and, by the aid of movable screens can be extended to the width of corridors on both floors. The classification of the school has received attention, and the author has adopted Gothic of the 15th century, as being associated with the foundation of the school in 1440, and as being different to the style of the buildings of the London School Board. Red brick and Portland stone dressings are proposed, and the estimated cost is £57,500.

The following architects are among the competitors:—Messrs. Wm. Ward Lee, Robert Walker, J. P. Seddon, H. S. Legg, T. S. Collett, Thomas Harris, E. C. Robins, Tarring and Wilkinson, J. D. Mathews, Lacy W. Ridge, Wilson and Aldwinckle, T. Roger Smith, Flint Clarkson, Newman and Billing, and Edward Clarke.

While admitting the superiority of one of the three selected designs, we cannot express so favourable an opinion of the others. The committee have certainly placed a good design first. If it is the best of the fifty-three, why not throw the others open for inspection?

THE IPSWICH MUSEUM COMPETITION.

THE town of Ipswich is going in for architectural improvement with a will. The designs for the Museum, Library, and Art Schools have quickly followed those of the new Post-office, recently reviewed in our pages. A capital site has been acquired facing the High-street, and through the exertions of a few of the leading townsmen the idea of erecting a building in which these three great wants of an intelligent community may be combined has so far been carried to a practical issue. Having examined the plans for the Museum, on view during the past week, we can say that the committee are to be congratulated on the professional response to their invitation. Although only ten designs have been sent

in, they are all above the average. No decision has been made at present, but the committee have held one or two preliminary meetings for the consideration of the plans. Of the ten designs, three deserve to be placed foremost as regards plan—an element which in the present case should have primary consideration. Among these "Simplicity" deserves notice for the compactness and economy of his departments, and the avoidance of passages and corridors, if we cannot say so much for the rather pretentious style he has adopted. We may describe the plan as being a rectangle of oblong proportion, with a central hall, entrance and staircase in the shorter axis. The hall forms an elongated area in the middle, and may be objected to as being rather too large, though, in justice to the author, it must be observed the space is used as part of the Museum, groups of sculpture and other large works of art finding here a fitting reception. The reading-room and library are arranged in three compartments—on the south side, and are *en suite*. These are well lighted from windows in the outer wall. On the right of hall a corresponding arrangement of the main walls provides for a class and lecture-room 46 × 24 in front, and a laboratory of similar size behind, and these apartments can be entered from a separate north entrance (for the use of students) in the return side of building, or from the central hall. The chief objection we find to the plan is the position of laboratory, which would be better in a more isolated part of the building. On the first floor the main walls are carried up so as to produce the same general division. Landing in a large central saloon or museum, lighted by a skylight, the visitor may pass through a series of apartments on the south side, in all respects like those below, one opening into the next. These are devoted to the museum. The front and back rooms are each 46ft. × 24ft., divided into bays by cases; the intermediate room is 33ft. × 26ft. They are lighted by windows and skylights. From the same landing the painting and class-rooms are entered, a short passage—the only one in the whole building—giving access to the rooms. It will thus be seen the Museum and School of Art form, practically, a range of apartments *en suite*, but on opposite sides. A masterly and sketchy perspective in pencil accompanies this set, the author adopting Renaissance with a centre crowned by a quadrangular-shaped dome, the remaining part of façade having pilasters of two orders. Between the windows of the ground and upper stories are a series of panels with subjects in relief; the lower pilasters have medallion panels at the top for heads representative of Science and Art. Pressed red brick and Ancaster stone dressings are proposed for the front—two good materials—but we think the design, though an able one, is too expensive in the materials specified; at all events, we object to the terminals along the top and the scrolled ornamentation of the upper window-heads. An alternative sketch in a Gothic dress, showing a centre fleche, is sent, but the treatment has less to recommend it, and the pointed arches in pairs are rather ecclesiastical in spirit. No plan has economised its wall-space so well as this one.

"Sivez Moi," whose authorship and motto we detect as being the same as that of plans sent in for the Post-office competition, shows a well distributed and skilful plan, though on a different principle to the last described. On the ground-plan the free library and reading-room and the science and art schools form two wings, entered from a centre vestibule, which makes a projecting block, the buildings being somewhat of the shape of a letter *u*. The building is proposed to be entered by a low porch and flight of steps, which leads into a spacious

vestibule, 24ft. by 24ft. Through a doorway on the left side a corridor runs along the front, giving access to the patent library and committee-room, the librarian's room, and to the reading-room and library, each 42ft. by 24ft., which last named apartments form a return end wing to the building, lighted at the sides and at ends. The north or right-hand wing is devoted to the science and art schools, and is entered through a similar doorway from the vestibule. The laboratory is placed at the back, filling up the space between the vestibule and the north wing, and is approached by a glass corridor and lobby, and areas for light and air well separate it from the front. The crooked corridor entrance leading from the vestibule to the school department is somewhat objectionable, but the departments are well separated, while the centre hall forms a common but distinct feature. On the upper floor the plan is enlarged by extending the museum between the library and vestibule blocks at the back, thus forming a quadrangular arrangement, with a central area for light and air. This has been effected by arching below the open space on the south side, an arrangement rendered practicable by the fall of the ground, though, on the other hand, it rather destroys the symmetry of plan below. Ascending the main staircase in the centre hall, the museum is reached from a half-landing, or from the main landing or saloon over the vestibule, and comprise four rooms *en suite*, arranged as a quadrangle. These are lighted chiefly by flat skylights above a deep cove, and the general effect is shown in a pencil sketch of the interior, and a north light is obtained for the painting-rooms. Externally, the design is treated in a Classic and dignified manner; there is a domical centre, with pediment and advancing wings at the ends, with coupled pilasters at the angles. The receding parts are quite plain, and hardly connect agreeably, but generally the design is characteristic of its purpose, and avoids a wasteful display of ornament, which is confined to a little carving and niches for sculpture between the angle pilasters. A carefully-drawn ink perspective and pencil sketches of the interior treatment accompany the design.

"Bona Fides," is the design of a local architect, and we may here express our regret the author of so good a plan should have made allusions in his description which only a local man could make, and thus have individualised his own work. The design is an economical one in its division, a rectangular arrangement has been adopted. The library and reading room, 60ft. by 34ft., occupy the middle of the area, and are lighted through a circular ribbed glazed roof; the museum is placed along the south side, and is 61ft. by 25ft., lighted by windows along the front with projecting show-cases between; the Science and Art Department is on the north side, and has its own entrance, and the laboratory is placed behind. An alternative plan shows the museum in the centre and the library on the left, a rather better arrangement in some respects. We do not see any communication from the gallery, which surrounds the enclosed library, with other parts of the first floor; but there are two spiral staircases provided in the angles to connect the main floors. In the sections, which are very creditably drawn and tinted, we observe the light is admitted at such angles as to avoid "glitter points," very essential to be observed in museums and galleries of art. The design is treated in red brick, with carved panels between the windows of the main stories, it has high roofs and chimneys well broken, and is in a Seventeenth Century style rather more Renaissance than Queen Anne, though the chimney springing out of a dormer on the south side would almost suggest the vagaries of the last-named style. A vigorously-drawn line perspective is sent in, and the

style of the drawings leads us to the conclusion that this and "Postage Stamp" in the last competition are by the same hand. The author submits a builder's tender to execute the work for £6,932 (why not £7,000?)—the last-named sum is little enough. Of other designs marked by considerable merit in the planning, we may name "Architect" as a compact arrangement, in which the museum is placed behind in a central position, the library and reading-room being on the south side. On the first floor the museum extends over the south wing of library and reading-room. We do not like the areas cut out of the museum by the lavatories; there are, nevertheless, a few good points in the plan, and little waste room, albeit the entrances are a little crowded. We cannot speak with commendation of the elevations. One in a Queen Anne style is spoilt by the projecting wings, with chimneys in the gables of unmitigated plainness. The back and sides are meanly plain. Another design is in a more finished species of the style, and the detail is better, the entrance forming in both elevations an arched terrace between the wings, but the west elevation is bare to ugliness. Its plan shows an arrangement in three parallelograms, the centre being the museum opposite entrance 55ft. x 33ft., a reading-room and library on the south side, and the school department on the north. The entrances and hall conveniences are not satisfactory. We believe the author of this has been the winner of the Corn Exchange prize.

"Patti chiari, amicizia lunga" adopts a more irregular plan. The museum is 93ft. by 35ft., and forms a flat, single-storied apartments, apparently too much cut off from the rest of the building on the south. The main entrance in front leads to a wide, lighted corridor, which runs along the structure at the back and gives access to the library and reading-room on the north side of entrance, with a curator's room between the latter and large museum. This distribution is less economical certainly than the more concentrated plan, which places the museum or the reading-room in a central portion of the ground. On the first floor we find the science class-rooms are arranged in front, entered from a long back corridor over the one below; the painting and model rooms are, as usual, in the north wing. The laboratory is placed behind opposite entrance. A domestic type of French Gothic is chosen, a pair of small gables and a projecting oriel from the science-room being the principal features in the façade. The elevation is certainly cleverly treated, and does the design more justice than the perspective. In "Pinpatch" we recognise, partly by the altered prefix, the same hand as in "Despatch" in the Post-office competition, and the author is one of the few who have adopted Gothic, and this time is more successful. Unlike the last-mentioned, a Late Tudor treatment has been chosen, a style certainly that has some claim to be employed in a brick locality, although it is rather suggestive of a collegiate character than a building devoted to mixed secular purposes. It is broken in front by a centre gable with oriel over the entrance and projecting wings; dormers with pinnacles break the roof line, and red brick in black mortar relieved by cross bands of dark brick in the sides form the chief ornamentation. The plan adopts the three parallelogram principle, a mode of dealing with the site that seems to have found favour with some of the committee. The museum, 80ft. by 30ft., surrounded by galleries, lighted from the roof mainly, makes the centre parallelogram, on either side of which are the conveniences, &c., while the parallel lateral wings are devoted to the other departments, the reading-room and library being on the south side. The laboratory is well isolated in

rear, and the science class-rooms are in the north wing. Double stairs are shown, one to each side; these and the conveniences are well studied, but the entrance is poor. On the upper floor the museum is extended over the library, and open lighted areas are obtained between the blocks. A carefully-drawn perspective accompanies the design, which certainly is not flattered by the elevations. The chimneys at the sides are unpleasantly twisted, and the pinnacles would have been wisely curtailed.

Two other designs demand notice: one is "Economy." The museum is made the centre feature, and is 60ft. by 40ft.; on the south side the library and reading-room are dovetailed into each other, an arrangement that is made to facilitate in the superintendence of these rooms, enabling one attendant to command a view of both. The museum has a circular roof of iron and side arcades of the same material, which also carry the gallery. The natural history museum is assigned the first floor in the south side. There is a corridor entrance to science school on the ground floor, also above to the art rooms, and some skill has been shown in the convenience of communication and classification. The exterior is well grouped, but the treatment of Renaissance character resembles a country residence more than a public building. "Pro Bono Publico" is the motto of an able design, the author of which submits two elevations, one in Classic, a plain, sensibly-treated, and compactly grouped building, and another in Gothic. The museum is a central apartment, facing the main entrance, with the library and reading-rooms forming wings on the south side; the main fault of the plan, otherwise ingenious, is that the doorways to reading-room and museum are not sufficiently under the control of the curator. The advanced class-rooms are well lighted by a north light, which enters through a curved pointed shaped roof. The Gothic is certainly the best of the kind submitted, as the author has avoided both the ecclesiastical and domestic types, and has imparted a thoroughly secular character to his design. We have space only to refer to "Veritas Vincit," a design in the Gothic, but of too school-like a treatment, and uneconomical and ill-considered in arrangement. The museum is undesirably placed at the north end on first-floor, and the schools are below. "Work and Win" is an elaborated plan in a similar style, giving much more than is wanted, and a little too ingenious in its octagonal vestibule and centre octagon-ended museum. The design occupies the whole front apparently in its length, and the roofing and gutters are particularly costly. Another design we saw looks more like the work of a plasterer, but it had no motto, while its design cannot be seriously criticised.

It will be observed from these remarks that there are three or four designs of considerable merit, and which the committee may fairly take as embodying all their wants. As in the Post Office, so in this case, the sum of £7,000 is inadequate, and it is not possible to carry out any of the designs as they ought to be executed for this sum. Our inquiries convince us, however, of the very limited resources of the committee, and that economy of construction must be first considered in the adoption of a plan. One or two of those we first mentioned, in which the departments are grouped round a central museum or vestibule, appear to afford the best chance of obtaining this. Unnecessary corridors lead to increased interior walling, and we should give preference, *ceteris paribus*, to the arrangements which dispense as much as practicable with interior passages and waste areas. A museum broken into several rooms with a vestibule forming a part of the suite, is more desirable for classification and study, than one long or large

gallery; another consideration should be the facility the plan affords to separate the schools from the public portion when necessary. The laboratory should if possible be isolated or nearly so, while of other essentials to economy, good lighting to the museum, reading-room, and class-rooms is of primary consideration. We understood the scheme originated with Dr. J. E. Taylor, the present curator of the museum, a gentleman whose scientific attainments are widely known; Mr. Westrop, a member of the Committee has been another moving spirit to whom the funds subscribed are mainly due; the plans submitted are creditable to the competitors, and under these circumstances we hope the Committee, who appear to have fairly courted inquiry, will select a design worthy of the town, and the energy that has been thrown into the competition.

EXHIBITION OF WORKS IN BLACK AND WHITE.

THE present exhibition just opened at the Dudley Gallery, though it sustains the reputation this collection has always enjoyed, is scarcely remarkable for any very striking work. We miss the contributions of several familiar contributors, Mr. Hubert Herkomer being one of them; on the other hand, the drawings are, technically speaking, above the order of merit we have previously remarked. Subjects in chalk, charcoal, lampblack, and sepia, abound, while there are many etchings of much beauty. Illustrations of journals and works of fiction as usual occupy a large space, and we have some excellent original sketches by W. Small, Percy Macquoid, Samuel Read, Charles Keene, H. S. Marks, R.A., Linley Sambourne, J. Tissot, E. J. Gregory, A. C. Corbould, and others, contributed to our contemporaries the *Illustrated London News*, the *Graphic*, and *Punch*. Thus Mr. W. Small's illustrations to "Under One Roof," a serial tale, in lampblack and white, thickly handled, are clever in composition and drawing, often humorous. We mention particularly of this series, Nos. 6, 263, 281, 327; Mr. Percy Macquoid's "Lucky Doz," Mr. Samuel Read's design (No. 29) in Indian ink; Mr. C. Keene's "Ploughing the Main" in pen and ink (75); Mr. H. S. Marks' "Finishing Touch" (113); Mr. Watson's "A Dreary Day" (308); Mr. C. Keene's ink sketch (251), and Mr. A. Hopkins' "Garden Party," are all sketches that display skill in design with a free use of the pencil, and many are familiar to our readers. A very spirited drawing in chalk is "Such Witching Looks are Baited Hooks," by Mr. T. W. Wilson. "Kindred Spirits," No. 19, by Mr. Lionel P. Smythe, is a happy idea executed in lampblack and white. The indolent, sluggish-looking boy shown on the swing, listlessly watching the playfulness of two cats, one clambering up a tree by his side, is thoroughly suggestive of the title chosen. The drawing is of considerable depth of tone and highly finished, wanting colour only to make it perfect. M. A. Mongin, in "Deux Eaux-fortes, d'après Meissonier" (30), exhibits two charming etchings with all the expression, delicacy and finish of Bebm and the early German engravers. In a more vigorous style is "Rochers de Douarnenez" (38). (eau-forte), by L. Le Conteux, a rocky coast. H. Pilleau contributes some pleasing sketches in lampblack (40), as also Felix Buhot, in an etching entitled "Aux Champs Elysée" (41). Architectural subjects are most rare, among the few we note Mr. W. H. Stock's sepia drawing of St. David's Cathedral, and Mr. Arthur Evershed's etching of the "Bloody and Garden Towers, Tower of London" (73) the latter careful both in drawing and detail. "Christchurch, Hants," is a capital subject hardly done justice to in the lampblack sketch, No. 53; Mr. C. F. Watson in

"Dawning Day," gives us a hazy but picturesque charcoal sketch of St. Paul's and the river, taken from the Charing-cross foot-bridge apparently. The Shot Tower in the foreground forms a pleasing balance and contrast to the dome, and the subject is an admirable one for treatment in sombre black and white. No. 58, "London from the top of Greenwich Observatory," is a large etching by Mr. W. Edwin Edwards, bold, vigorous, and characteristic, but a trifle too black in the park scenery, albeit the subject is provocative in its spirit of the Latin line, "Fumus et opes strepitumque." A twilight effect is happily produced in Mr. Weedon's "Fittleworth Lock," the poplars against the half-lighted sky make a capital picture, broad and characteristic in treatment. Mr. Arthur Evershed is a very feeling etcher. His "Kingston on Thames" (91) conveys a good idea of a picturesque locality, while the execution exhibits technical power. "Antwerp Cathedral" (93), is one of Mr. W. Crooke's best etchings rendered with considerable skill in detail. We are glad to find the works of Leon Lhermitte still adorn the walls of this gallery, and we may especially point to Nos. 96, 106, 327, and 377, as very fine. "Halle aux Poissons de St. Malo," is one of the largest drawings. It is executed in charcoal, and represents a group of fish-women engaged by buying. The chiaroscuro, like that of all M. Lhermitte's pictures, is excellent, and the grouping and drawing of the figures display quite the hand of a master. It has all the solidity and force of an oil-painting. "L'Épicerie de Morlaix" we fancy to have seen before. The overhanging houses of the quaint old French seaport are cleverly drawn, while before the shop-doors a grocer's gossiping on between some women. "La Visite Pastorale" (327) is another charcoal drawing of a fine Early Pointed church, in which the bishop is giving his benediction to a group of worshippers. For solidity, light and shadow, and grouping there is nothing equal to it in the Exhibition, except the same artist's "Interior of the Church of Mezy" (No. 377), in which we note a very similar detail of stiff-foliaged capitals. Mr. Arthur Croft sends a pencil drawing of "Lago di Varese" (121), a fine bit of scenery and manipulation. Mr. J. Wolf's "An Elephant Abroad" (122) is a clever fancy picture, softly finished in charcoal, yet of considerable energy. It depicts two kangaroos watching the approach of an elephant through a field of thick herbage, barely discerned through a misty atmosphere. "Le Début de la Walküre," G. H. Fautin, is dramatic and forcible. "Proofs of Wood Engravings" (129), by Mr. F. G. Kitton, contains a charming little etching of Ratisbon, from the pencil of H. W. Brewer. "The Path to the Wood," by Mr. Allan Barraud (131), sustains that artist's reputation; while we must not pass unnoticed Mr. River's "Cathedral Porch, Seville" (132), in pen and ink; Mr. Tristram Ellis's "Four Etchings of Cyprus"; Mr. H. Bennett's pen and ink drawing of a poetic incident in the Frog Prince; a sepia drawing of House at Old Bavono by E. V. B.; a clever sepia sketch of a yacht by Francis Powell (169); a study for an illustration; and "October" (179), a highly finished etching by Mr. James Tissot showing a richly silk attired girl picking her way through a bower of chestnut foliage. Two small pieces in sepia, with the signature E. V. B., take the fancy for the thoroughly poetic or allegorical sentiment conveyed. One is the "Last Days of Conrad, Poet and Philosopher"; the old man looks bowed down and meditative; on the books before him are written the word "Nihil," as expressive of his despair; a youth is handing him a volume upon which is the significant word "Spes." The "Heart of Stone" is another sketch in India ink—a legendary

idea conceived and worked out with much skill. The most remarkable of the exhibits are hung upon the end wall of the gallery. Here we have a few designs and drawings of undoubted merit. Mr. H. Holiday, in No. 197—"Studies from a Group for a Decorative Cartoon"—shows a red chalk drawing, the subject being St. Paul's Conversion. Conceived with considerable feeling and truthfulness is Mr. Frederick Goodall's "Study for the Infant Moses" (198). The rounded limbs are admirable in drawing, and well shaded, and the expression of the infant's face calm and dignified. Mr. Walter Crane exhibits four subjects this year, and, as a pencil sketch of an architectural subject, his "Isola de San Bartolomeo with Pons Cestias" (199) must be noted. Mr. E. J. Poynter, R.A., is represented in a few studies of classical figures. His "Study for a Figure of Esculapius" (207), in red chalk, and the sketches for figures and drapery in his great work at the Royal Academy, the picture of Nausicaä, besides a study for the latter figure, particularly call for mention (No. 215). Mr. Edward Burne Jones figures also in some exquisitely-drawn studies (212, 213, 236, 238), drawn in pencil on a dark green-toned ground. His "Studies for a Man at an Organ" are full of poetic meaning; and his frame of "Five Studies" exhibit classical feeling in composition combined with admirable finish; the outline and drapery of the women are drawn with consummate delicacy and grace. In this class we must not pass by Mr. Poynter's "Studies for a Figure of Helen" (239), in which the painter shows three classically-conceived women, though scarcely of that surpassing beauty recorded in the mythical accounts of the Trojan War. Mr. F. Goodall's "Holy Mother" (224) occupies the place of honour. The mother has her hand fondly holding the infant Saviour upon her knee; the countenances of both are inexpressibly tender and softly cast, and the limbs of the Holy Infant mobile and graceful. An ideal sentiment pervades the composition, the figures being relieved by hangings. In execution, nothing can surpass the finish and softness of the piece, which is in black chalk upon grey paper. We cannot pass by Mr. W. E. F. Britten's graceful study for the drapery of Arachne (216), nor Mr. John Medland's view of Trequier Cathedral, Brittany, in pen and ink, the latter a boldly drawn sketch of Norman and Pointed towers and cloister. Mr. Ernest George contributes two of his characteristic etchings. Very picturesque are the old galleried houses on the Ile Strasburg (235) and the "City Ditch, Basle" (399). The first is a charming *bonne bouche* rendered in a remarkably feeling style. We must note also Mr. P. Macnab's "Study of a Head of a Westphalian Peasant" (248), Mr. D. Law's "Peat Moss Head of Loch Awe" (262); "A Cynic," by Mr. J. W. Waterhouse, a study of Athenian life, in sepia. A few bold charcoal drawings by Mr. Seymour Haden, as 290, "A Salmon River" (307), and "In a Wood" (404), are forcible in their handling of light and shade, but all of great depth of shading and Cimmerian in tone. Mr. Fitzgerald's "Jack Frost" (361) is a clever drawing, in which the spectral embodiment of frost is ingeniously introduced; Mr. Arthur Severn's "Moonlight at Sea" (376) is a charming bit of water; Mr. F. Murray, in 401, "The Death of Wood in the days of Iron," tells its story with feeling and effectiveness, while we must not pass "The Vesper Bell," an etching by A. H. Haig (334), and No. 354, "Ailsa Craig," a large and powerfully drawn charcoal view of this grand rock, by Mr. F. Powell; Mr. Frank Dillon's fine charcoal drawing, "Lotus Pools, Japan" (355), suggestive of decoration in the crane on the wing; and Mr. R. Josey's engraving of

"Helen of Troy," after Sir F. Leighton, P.R.A. (427). There are a few others we must mention, such as Mr. Cave Thomas's fine conception, entitled "Truth Foiled at the Door of Prejudice" (478); Mr. J. L. Dollman's clever drawing in charcoal of "Night" (525), and Mr. Watson's "Drury Court" (477), an etching.

PERSONAL AND PROFESSIONAL RECOLLECTIONS OF SIR GILBERT SCOTT.*

[SECOND NOTICE.]

THE period dealt with in the portion of the book we now reach was undoubtedly the turning-point of Sir Gilbert Scott's professional life. In conjunction with his partner, Moffatt, he had obtained a fair practice of its kind, which, in the ordinary course of things, should have expanded in very different directions from that it actually took. Prisons, schools, or hospitals might as a matter of course have been added to the practice of a firm of architects whose business had started with workhouses, but that the senior partner should suddenly devote himself to ecclesiastical architecture with the measure of success which accompanied his efforts can only be accounted for on a supposition which was really a fact, namely, that some powerful outside influence suddenly developed capabilities and aspirations which were but waiting to be called forth. This influence came from Pugin, whose own efforts in the revival of Gothic architecture were so successful, and yet so surpassed, as far as actual results were concerned, by the architect who was to adapt the great art principles which Pugin revived to the needs of a faith with which the latter could have no sympathy. How this came about Sir Gilbert Scott himself tells us.

In 1838, shortly after his marriage, he built his first church at Lincoln, of which he honestly says he can say little in its favour, except that it was better than many others then erected. Six others followed, all agreeing in the meagreness of their construction and the contemptible character of their fittings, in most of them being galleried to the very eyes, and in the use of plaster for internal mouldings even for the pillars. These, as Sir Gilbert Scott admits, "were days of abject degradation," only lasting, it is true, about two years, but he adds—"Alas! what a mass of horrors was perpetrated during that short interval! Often, and that within a few months of this period, have I been wicked enough to wish my works burnt down again." In 1840, however, came the awakening. An acquaintance with the Cambridge Camden Society, and the perusal of Pugin's articles in the *Dublin Review*, followed up by a severe lecture from Mr. Webb, the secretary of the Camden Society, led Scott to become a reader of the *Ecclesiologist*. Pugin's articles in that magazine excited him "almost to fury," and he suddenly found himself like a "person awakened from a long feverish dream." His first longing was to make Pugin's acquaintance. He made an excuse for writing to him, and, to his "almost tremendous delight," Pugin invited him to call. Of Pugin Sir Gilbert says:—

"He was tremendously jolly, and showed almost too much *bonhomie* to accord with my romantic expectations. I very rarely saw him again, though I became a devoted reader of his written, and visitor of his erected works, and a greedy recipient of every tale about him, and report of what he said or did. A new phase had come over me, thoroughly *en rapport* with my early taste, but in utter discord with the 'fittful fever' of my poor-law activity. I was, in fact, a new man, though that man was, according to the trite saying, the true son of my boyhood."

* Personal and Professional Recollections of the late Sir Gilbert Scott, R.A. Edited by his son, G. GILBERT SCOTT, F.S.A. London: Sampson Low, Marston, Searle, and Rivington.

While the awakening was thus commencing Sir Gilbert was invited to compete for the erection of the Martyrs' Memorial at Oxford. He threw himself into the contest with all the ardour he possessed, and succeeded. Of the result, he says that it was achieved before his complete awakening to a true feeling for church architecture, is proved by the defects of the accompanying addition to St. Mary Magdalene's Church; still he fancies the cross itself was better than any one but Pugin would then have produced. Shortly afterwards two other important works came into the office: the Infant Orphan Asylum at Wanstead and the Church of St. Giles, Camberwell. The plan of the first was Moffatt's, the design Scott's. The second building was not erected according to the competition drawing, which was a "very ambitious design, groined throughout with terra-cotta," but was a less costly structure, the result of parochial opposition and a compromise. The first restoration Sir Gilbert undertook was the refitting of Chesterfield Church, where, though working as yet in the dark and hampered by restrictions, he seems to have recovered and retained the old rood-screen which, some years later, the *Ecclesiologist* declared he had sold, and that it had only been recovered by the exertions of the parishioners. The anti-restorationists of our own day, it will be seen, have not altogether enjoyed a monopoly of the capability for exaggeration. Sir Gilbert's real initiation into such work came, he thinks, with the restoration of St. Mary's, Stafford, which after considerable controversy, in which the Rev. J. L. Petit took an active part, he was allowed to undertake. During the earlier part of the work he had the advantage of the services of his friend Edwin Gwilt, the son of old George Gwilt, the restorer of the choir and Lady chapel of St. Saviour's, Southwark. He was conservative to the backbone, and though Sir Gilbert Scott admits that too little actual old work was preserved, he believes that, barring this, no restoration could have been more scrupulously conscientious. The most serious part of the work was the repair of the central tower, the four piers of which had become so crushed, that they had to be almost entirely rebuilt. Dangerous and unenviable work this, but work which Sir Gilbert Scott had so frequently to repeat, that his cautions respecting the same may be well reproduced here:—

"I. Be assured that no amount of shoring can be too much for safety, no foundations to your shorings too strong, and no principles of constructing it too well considered. II. Use the hardest stone for your new work which you can procure, and spare no pains in bonding it, and tying together with copper. III. Be very slow in your operations, excepting at critical junctures, where the very contrary is necessary; be careful in your principle of movable supports, as you cut away old work; set every stone in the very best cement, and run in the core with grout of the same material. IV. Key up well at the top, and leave your shoring a long time after the work is done, and then remove it with the greatest care. V. (Though more properly first.) Tie your tower well together with iron before you begin, and take especial care of your foundations. Above all, have a thoroughly practical clerk of the works, neither too young, nor too old.

"The shoring must be all of undivided timbers, and often of four or more such balks, bound and bolted together into one by irons."

The poor-law work of the firm still continued, but very different buildings were now erected from those with which Scott and Moffatt's practice commenced. The style of the work was usually Elizabethan, and in many cases the designs were really good. Sir Gilbert especially mentions those at Dunmow, Billericay, Belper, Windsor, Amersham, and Macclesfield. Meanwhile the church practice—restoration, as well as new buildings—rapidly increased in quantity and merit. One restoration—that of the beautiful chapel of St. Mary, on Wakefield-

bridge, to which Sir Gilbert says he devoted his best energies, was certainly rendered abortive by one false step, which in later years caused him the "utmost shame and chagrin." The contractor who had been Scott's carver, having a handsome offer made him to re-erect the semi-decayed front of the chapel in a park close by, offered to carve a new one in Caen stone. Sir Gilbert Scott consented to the proposal. The new front, it is true, was a masterpiece of workmanship, but the Caen stone in which it was executed is now more rotten than the old work which was removed to make room for it!

In 1844 Sir Gilbert was induced to enter into the competition for the rebuilding of St. Nicholas' Church, Hamburg. Up to this time he had seen nothing of Continental architecture except during a two days' visit to Calais; he at once, however, made up his mind that the style of his intended design must be German Gothic, and that he must make that style his study. He accordingly set out on his first Continental tour, working through Belgium to Cologne, where he found himself uncertain whether he ought to adopt the semi-Romanesque, of which that city supplies such a field of study, or the complete Gothic of the Cathedral of Altenburg. He was unaware then of the French origin of the latter style, and the phase he ultimately adopted was founded rather on 14th than on 13th century work. His journey had enabled him to catch the general spirit of German work—the drawings were well finished, the best elevations being made by Mr. Coe and Mr. Street, and the effect of them upon the people of Hamburg "was perfectly electrical." They declared that the design was more German than that of any German architect, and though some delay and opposition ensued, the triumph of the English architect was certain. One of the consequences of this competition was a violent attack upon Sir Gilbert at home in the *Ecclesiologist* for undertaking a Lutheran church. He wrote a formal reply, to which—with unfairness equal to their bigotry—the conductors refused admission. It is given at length in the book, and is, apart from all architectural considerations, a well-argued defence of the position of the Lutherans.

In 1849, wholly unexpectedly but to his great and lasting delight, Sir Gilbert was appointed architect to Westminster Abbey, in succession to Mr. Blore, who had just resigned. He at once commenced a careful investigation of its antiquities, and the good fruit they bore is too well-known to need further mention here. A short tour in Italy in 1851, in company with Mr. Benjamin Ferrey, seems to have been a welcome and well-enjoyed holiday. Berlin was first visited, where the affected delight of the hotel-keeper at seeing him was complacently attributed by Sir Gilbert to the fact of his being the architect of St. Nicholas at Hamburg, but his vanity was rudely shocked on discovering that the worthy host had taken him—or pretended to do so—for Sir Walter Scott, the poet. Sir Gilbert thinks he gained much by his Italian tour, but he returned home convinced that Italian Gothic as such must not be used in England, although its study was desirable and indeed necessary to the perfecting of our own art revival. The same year, in conjunction with Mr. C. Bruce Allen and a number of architects, the Architectural Museum was founded. The scheme hung fire at first. "Street discouraged it as tending to copyism, Butterfield gave very cold support, poor Pugin was just laid by." Sir Gilbert, however, went to work with a will, got up a good list of annual subscribers and about £500 in donations, lent his own large collection of casts, and set agents to work to procure new ones. A loft was taken in a wharf at Cannon-row, Westminster, which was soon filled

"There we used to have lectures in the midst of our specimens. There Ruskin has poured forth his most telling eloquence. There we held annual conversations, when 500 or 600 persons were presided over in the cock-loft by the prince-like Earl de Grey, and were addressed often by some of the first men in the country; but, above all, here were our carvers taught their art from the best ancient models, and our students acquired a degree of skill and taste in the drawing of architectural ornament which had never before been reached, nor has (since the removal of the museum) been retained. These were the days of our pride, and I confess that I even now feel a pardonable exultation when I call to remembrance the share I took in bringing about such noble results. No movement ever made in our day, had equalled this in its effects both upon workmen and students. Our cock-loft was the centre of their artistic study and improvement, and to myself and others engaged in the work it was a source of constant and almost daily delight and interest. During my journeys I was ever looking out for objects of art, whose representation might enrich our collection: and even in the gardens, in the fields, or by the seaside, the very leaves and flowers seemed to connect themselves with our art-scheme, and to suggest plans for illustrating all such productions as would lend suggestions to art."

It is not out of place here to remind those who have not yet associated themselves with the memorial to Sir Gilbert Scott, which is now being promoted by those who at present guide the destinies of the Architectural Museum, that the above passage but faintly indicates the interest Sir Gilbert Scott took in this his favourite project. "The vision was, however, soon clouded." In his enthusiasm he had outrun the constable, for heavy debt stared the Museum in the face. An appeal was made to Caesar, and, as usual, Caesar took particularly good care to have his equivalent for the help vouchsafed. A deputation consisting of Sir Gilbert, Earl de Grey, and Mr. Clutton, who was then the hon. secretary to the museum, waited on the Prince Consort, who promised and gave aid, and became the "patron" of the scheme. His Royal Highness favoured the deputation with a *réchauffé* of one of Mr. Cole's lectures on the contemptible state of architectural education in England, and referred them to Mr. Cole and Mr. Redgrave, who took up the case with some favour, the result being an annual subscription of a hundred pounds, on the condition of the free admission of the students of the South Kensington School of Art. The ultimate result need not be further referred to. South Kensington for a time swallowed up the Architectural Museum; "students were frightened away by distance and red tape." And although, later on, these annoying circumstances were, as Sir Gilbert Scott admits, much mitigated by the noble collection brought together under the same roof by the Science and Art Department, and the first-rate art library since added to it, no one can doubt that the subsequent emancipation of the Architectural Museum was a healthy return to the principles of independence and self-support which contributed to its establishment. Let those who are now responsible for its maintenance bear well in mind the lesson taught by the "Recollections" Sir Gilbert Scott has left behind him.

We may pass more rapidly over the remaining pages of the book, because the events with which they deal are, for the most part, familiar to our readers—at any rate, to those whose acquaintance with this journal dates from its foundation. There are, however, one or two important matters which must be noticed, the first being the dissolution of the firm Scott and Moffatt, in 1846—a step Sir Gilbert Scott had long desired to take, but to which he was only ultimately spurred on by the importunities of his wife—and the next the competition for the Government Offices, in the autumn of 1856. As usual, the competing architects got little but vexation and disappointment for their pains. The original scheme fell through altogether, and after much delay, in 1858 Sir Gilbert Scott was appointed architect for

the Foreign Office, and Sir Digby Wyatt for the India Office, in conjunction with him. The designs were made, and working drawings ordered and proceeded with, when Sir William Tite commenced a violent opposition in Parliament aided by the support of Lord Palmerston. Possibly, had the Tory Government remained in office Sir Gilbert might have pulled through, but the general election of 1858, which resulted in the return of Lord Palmerston to power, destroyed all hope. Palmerston sent for Scott and told him plainly that he did not want to disturb his appointment, but that he must insist on an Italian design. Still Sir Gilbert struggled on with such "faith in Gothic" that he always believed "something would turn up in its favour"; the ultimate result in 1860 being a total alteration in the arrangements with regard to the building, and a threat on the part of Lord Palmerston to cancel Sir Gilbert Scott's appointment if he did not conform to his lordship's art notions. With excessive regret and sorrow Scott had to give in, his consolation being, as he says, "The public seemed to understand my position and to feel for it, and I never received any annoying or painful rebuke, and even Mr. Ruskin told me I had done quite right."

Sir Gilbert apparently was a believer in ghosts. He took a house in the Isle of Wight on the very edge of the Chine, and in his book simply says that "the house was haunted." Mr. G. G. Scott corroborates the story. Footsteps used to be heard on the verandah, and the boys of the family set themselves to detect the ghost, but in vain. All the usual infallible methods of catching such creatures were tried without effect. Of course, they soon found out that other visitors had been similarly frightened; and then a story came out about a wicked uncle who murdered his innocent niece and ward in a cellar, and who, for his sins, was let out of Hades to pace the flagging where he was used to walk. These stories always turn up after the ghosts begin to haunt the scenes of their crimes, and the experience of Sir Gilbert and his family seems to have been precisely that of other people who have been similarly deceived.

Among the personal recollections which follow are those relating to the bereavements of Sir Gilbert's later life, the death of his son, his sister, his wife, and others; among those having reference to professional matters are the records of his share in the New Law Courts Competition, his "great failure," the erection of the Prince Consort memorial, the St. Pancras Station, and the various cathedral restorations with which he was concerned. The volume closes with some remarks on the Queen Anne style and the Anti-Restorationists of a sensible and practical kind, and altogether the book is a most interesting one, chiefly so, however, in its first pages and their record of the struggles which laid the foundation of the vast practice which was the admiration, and perhaps the envy of his brethren, but of which all must admit the wonder was, all things considered, so much was done and that so well.

ARCHITECTURAL ASSOCIATION.

THE last meeting for the present session of the Association was held on Friday evening, the president, Mr. H. L. Florence, in the chair. Mr. James Lindsell was elected as a member. Mr. HAYES announced that an extra visit had been arranged for Saturday, the 14th inst. (tomorrow), when the President would conduct the members over the new offices of the Holborn District Board of Works at the corner of Clerkenwell and Gray's-inn roads, erected from the designs of his partner, Mr. Isaacs, and himself. The President said he was glad to be able to state that his appeal on behalf of the Architects' Benevolent Society had been well responded to, more than the suggested £100 having been subscribed during the past fortnight. The Presi-

dent further announced that the annual dinner would take place on Monday, the 16th inst., at the Holborn Restaurant.

A TOUR ON THE CONTINENT.

Under this general title Mr. HAMPTON W. PRATT included a paper which he read descriptive of a ramble over about 7,000 miles of country in Italy and France, undertaken during eight months of last and this year. The paper was almost confined to an examination of the modes of church planning in Italy and France. The lecturer struck out the plan of his route as follows:—Starting from Paris he visited Chartres and Orleans, whence he followed the valley of the Loire to Nantes—a district well known, he remarked, for its picturesque chateaux. He next skirted the coast of Brittany, traversed Normandy, and returned to Paris by way of Amiens and Beauvais. Leaving Paris once more, he took a long journey to the south of France, and from thence to Geneva. After a holiday in Switzerland, he went through various towns of North Italy to Venice, and then to Bologna and Ravenna. Crossing the Apennines, Florence, Rome, and Naples were visited, and on the return journey various towns in Lombardy were seen, and he returned by way of Turin and Dijon to Paris. Many of the Italian cities are finely situated on the summits of irregular eminences, but in picturesqueness of buildings themselves, *i.e.*, in outline and grouping, the French are, he considered, far ahead of the Italians, and in some respects, of ourselves. In detail, however, English Mediæval work held the palm for solidity and thoroughness, though the Italian brick, terra-cotta, and stone treatment was refined and pleasing. In a single lecture dealing with such a wide field he must confine himself to one class of buildings, and he proposed, therefore, to deal with the ecclesiastical edifices visited. In Rome and Ravenna were to be found the earliest and best examples of the simple Basilican type of church, with sundry variations. That at S. Cosma e Damiano, Rome, is a nave and apse without aisles. At Ravenna we universally find no transept, but nave, aisles, and an apse, as at S. Giovanni, Evangelista, S. Apollinare Nuovo, and S. Apollinare in Classe. The fine patriarchal basilica of Sta. Maria Maggiore has transepts of same depth as aisles, while at S. Prassede the transepts project beyond. S. Paolo fuori le Mura and the Lateran Church furnish examples of a nave with double aisles, transept, and apse. Unfortunately, all these churches are not spared to us in their original condition—those at Ravenna are perhaps the most intact, while Sta. Maria Maggiore was altered and added to in the 12th, 15th, and 16th centuries; S. Paolo fuori le Mura, once the finest, was destroyed by fire during the present century, and is now rebuilt on its original grand scale, and wears a modern and expensive dress. The Lateran Church has also been destroyed by earthquake and fire, rebuilt and altered at various times. Passing on to consider Mediæval basilican churches, he might mention that it is an exception to find lateral chapels to nave, but these occur at Verona Cathedral, S. Giovanni e Paolo, Venice; S. Petronio, Bologna; Parma Cathedral; S. Croce, Florence; Orvieto Cathedral, and the Certosa di Pavia. The placing a series of eastern chapels to transepts has a very good effect; at S. Giovanni e Paolo, Venice, and at Sta. Anastasia, Verona, there are two to each transept; at the Frari, Venice, three, while Sta. Croce, Florence, has a row of five on either side. Another plan occasionally met with, is a choir raised some 7 or 8 ft. above the level of the nave, and approached by a flight of steps on each side, below being a crypt entered by an arcade from centre of nave, and with a descent of about 4 ft. These Romanesque crypts have often quite a forest of small columns dividing the area into alleys. They are usually used as a winter choir, and are much warmer than the upper part of church, though when crowded as they frequently are with worshippers, the atmosphere is such as to force one to beat a hasty retreat. There are examples of this treatment at San Zenone, Verona, S. Minalto al Monte, Florence, and also at Fiesole, Piacenza, Parma, and Modena Cathedrals. The provision of a triforium gallery is occasionally seen; this arrangement for the accommodation of women occurs in the early basilicas of S. Agnese and S. Lorenzo fuori le Mura, Rome, at a later period in Sant' Ambrogio, Milan, and the Cathedrals of Pisa, Lucca, and Parma. The double-aisled church is not often met with in Italy; besides S. Giovanni in

Laterano and S. Paoli fuori le Mura, may be mentioned Pisa and Milan Cathedrals, both of which have transeptaisles as well, and Pisa double-choir aisles. In the latter cathedral the triforium gallery is continued across the transepts, extending over the two aisles, but reduced to the width of one aisle across the transept. This curious feature does not commend itself to one, for the transepts are already long and narrow between their aisles, and this makes them look more so, moreover destroying the effect of the cross-plan, and suggesting an after filling-in. The transepts of Lucca Cathedral are treated in a somewhat similar way, but instead of the gallery being carried across there is only a wall pierced with similar openings to the triforium and no passage of communication, and, further, the transept itself is divided longitudinally into two aisles by a similar archway and piercings, the effect of which is by no means bad. He next came to a numerous and interesting class of buildings, which left a marked impression on the visitor to Italy; he referred to the numerous churches and baptistries of a round and octagonal plan, and to which a domical covering seems so natural and appropriate. The Pantheon at Rome was, perhaps, the first Pagan temple that was transformed into a Christian church, the consecration taking place A.D. 609, some half-dozen centuries after it is supposed to have been built. Outside the walls of Rome is the circular church of S. Costanza, which is covered with a dome of about 70ft. diameter, and surrounded by a barrel-vaulted aisle opening into the central part by an arcade of 16 circular arches, supported on double columns (one behind the other). This building was erected by Constantine as a monument to his daughter Constantia, and was not converted into a church till 1256. On the Coelins is the interesting church of San Stefano Rotondo, noted for its great size, and originally consisting of a circular space, about 70ft. diameter, surrounded by two aisles, making a total diameter of about 210ft. It was erected at the end of the fifth century, but subsequently fell to ruin, and in the fifteenth century the inclosing wall was formed by filling in the space between the columns dividing the two aisles. At the foot of the Palatine is San Teodoro, another round church, erected probably at the end of the 6th or beginning of the 7th century, and supposed to occupy the site of a temple. Adjoining the Lateran church is the ancient Baptistery of S. Giovanni in Fonte, erected in the 4th or 5th century. The interior consists of an octagon areaded in two heights, covered by an octagonal dome, and surrounded by an aisle. At Ravenna we find Sta. Maria in Cosmedin, a small octagonal-domed building, said to have been an Arian baptistry, the 6th century mosaics being added when it was adapted to the Roman Catholic faith. Adjoining the cathedral is a larger baptistry, also octagonal, and domed; this was erected in the 5th century, and also retains its font of that date. Most interesting of all, however, is the Church of San Vitale, consecrated in 547, and regarded as the earliest Byzantine church in Italy. This singular building consists of a foliated octagon, surmounted by a circular cupola, and surrounded by a regular-sided octagonal aisle, over which is a gallery. Each semi-cylindrical side of inner octagon is pierced with a triple round-arched arcade both at ground floor and gallery levels, and the base of dome is pierced by a two-light window over each recess. The continuity of the aisle and gallery is broken by the formation of a choir, which projects beyond the octagon, and is apsidal-ended. On the opposite side to choir is the principal entrance, now unhappily disused, being rendered inaccessible owing to a large cloister, or parade ground, attached to a barrack. The raising of the whole level of the city of Ravenna has affected this as well as the other churches, the floor being about 3ft. higher than its original level. The effect of the interior is unfortunately spoilt by the painting on the walls and dome in horribly clever chiaroscuro, the colour being in strong contrast with the beautiful mosaics in the choir and the rich marble veneering of the lower part of walls and piers. The Church of S. Lorenzo at Milan is another domed octagonal building; it is surrounded by an aisle, and has four semi-circular apses. At Perugia is the round Church of S. Angelo, supposed to be of the 6th century; the central part is about 40ft. diameter, and has an arcade of 16 circular arches, with a surrounding aisle; the central part is sixteen-sided on the exterior, but no dome exists.

The Baptistery at Florence was formerly the Cathedral. There seems to be some doubt as to the date of its erection, some ascribing it to the 7th or 8th century; its present character is the work of subsequent periods and its present use dates from the 12th century. It is a large octagonal building with a square recess on one side; a narrow gallery surrounds the interior, and at the summit of the cupola is a small lantern erected in the 16th century, before which time it is said to have been lighted like the Pantheon—an arrangement which would be appreciated at the present day by those who wish to see the beautiful mosaics on the dome, but who are deprived of that pleasure except on the very brightest days. S. Sepolchro, Bologna, is probably of the 9th or 10th century. The central part is 12-sided, and covered with a dome of corresponding shape; a 12-arched arcade opens into the surrounding aisle, the outer wall of which is octagonal. This church forms a part of what is considered one of the curiosities of Bologna, namely, a cluster of seven churches all united together, built at different times, and occupying different levels. A rough ground-plan (exhibited) shows that church No. 1 is a late and uninteresting building, from which No. 2 (S. Sepolchro) is entered by a descent of a few steps. This building just described was probably the baptistry to No. 3, which is an interesting brick church of about the same date, and dedicated to SS. Pietro e Paolo. Doorways on the east of the baptistry lead to a sort of atrium which forms No. 4, while a flight of steps in one angle leads to an 11th century crypt under the east end of No. 1, this crypt forming Church No. 5. No. 6 is entered both from the atrium and crypt and is formed by inclosing the north and west sides of an 11th century cloister belonging to a supposed monastery, while No. 7 is an irregular-shaped church of various dates. The seven-fold mystery is thus seen on investigation to be rather far-fetched. The Baptistery at Pisa was commenced in 1153, but long remained unfinished, and was only completed in the 14th century. It is circular on plan, and about 100ft. in diameter, within this circumference being an aisle all round, with a gallery over and an arcade of twelve arches to both stories. The upper part of the wall on exterior becomes a polygon of twelve sides. Covering the whole is a double twelve-sided dome, the inner one conical and the outer one hemispherical. An unpleasant outline results from the cone rising upwards of 30ft. above the outer dome. In the same city is the small church of S. Sepolchro, commenced in the same year as the baptistry, and by the same architect—Diotisalvi; it is an octagonal building, also containing an aisle, and was built for the Knights Templars. The Baptistery at Padua dates from the 12th century, and is interesting on account of its unusual plan, which is a square, surmounted by a circular dome, on the east side being a small apse, also domed; 14th century frescoes cover the walls and dome, and make a delightful interior. At Cremona there is an octagonal domed baptistry, erected towards the close of the 12th century and at the beginning of the 13th century the baptistry at Parma was built; the exterior is octagonal, and the interior sixteen-sided, with two galleries carried round and covered with a dome. The latest of this series of baptistries was the one at Pistoja, erected in the 14th century and built in the characteristic Pisan style, but possessing a very bald interior; it is octagonal and has a lantern at summit of cupola, and also has an external pulpit. We must now consider domed churches, and first will consider S. Mark's, Venice, commenced at the close of the 10th century. Its plan of a Greek cross covered with five cupolas is familiar to all. This arrangement alone is sufficient to interest and delight one, but when to that is added a marvellous wealth of colour on walls, vault, and pavement, our enthusiasm knows no bounds. Of all buildings that have ever been described and analysed, perhaps none have been more thoroughly and lovingly so than S. Mark's, by our architectural poet Mr. Ruskin, and indeed so far has his zeal carried him that he seems to find nothing throughout but what is beautiful and consistent, though others are not prepared to go with him to that extent. Somewhat analogous to S. Mark's, though with no real resemblance, is the Church of Sant' Antonio, Padua, erected in the 13th century. It consists of nave and aisles, transepts and apsidal choir, surrounded by an aisle and chapels, the whole covered by seven cupolas. In spite, however, of this grand con-

ception, the interior suffers from poverty of treatment, while the exterior at first sight has an uncomfortably crowded look. Viewed at a little distance the group assumes a more pleasing form, and the several domes surrounding the more pronounced central one, together with the lofty and slender octagonal minarets, constitute a unique and striking whole. The dome forms also a prominent feature at the Duomo, Florence, Siena Cathedral, S. Peter, Rome, &c. Just a word about the plans of these buildings. That of Sta. Maria del fiore, Florence, consists of an immense octagon 138ft. 6in. internal diameter, surmounted by a lofty dome of corresponding plan. On the north, south, and east sides are semi-octagonal-ended arms, each surrounded by five chapels, and west of the octagon is a long nave and aisles divided into four enormous groined bays. Siena Cathedral has an unequal-sided hexagon at crossing, and a squinch at each angle converts this into a 12-sided figure, covered by a circular dome; this, as at Florence, is crowned by a small lantern. At the crossing of Pisa Cathedral is an elliptical dome which cannot be regarded as satisfactory either internally or externally. The dome of St. Peter is known the wide world over, but the regret may be expressed that so important and striking feature of the interior should be incapable of being seen except at an unreasonable distance. We must next notice the Renaissance churches, erected in large numbers during the 15th and 16th centuries. The grand schemes adopted for many of these churches is a striking feature, and the use of domical coverings a rule scarcely departed from. In Florence is the Church of Santo Spirito, erected from the designs of the architect of the Duomo, although not built till after his death. A somewhat unusual plan is here adopted—viz., a Latin cross, with aisles and semi-circular chapels all round, and a circular dome at the crossing. Sta. Maria Formosa at Venice is a church with barrel-vaulted nave and transepts, domical aisles and three apses. At Ferrara are a couple of churches with some pretence to notice, viz., San Francesco and San Benedetto. The former has domical-covered nave-aisles and transepts, square side chapels, and an apse with two chapels on either side. San Benedetto has a nave and apsidal transepts, domical-covered aisles and apsidal side chapels, three eastern apses, a domed lantern at crossing; the nave, except for a flat cupola, and transepts being barrel-vaulted. The church of San Sisto, Piacenza, has a very effective plan, consisting of a barrel-vaulted nave, transepts, and choir, with dome at crossing; transept also at west end, with intersecting dome, and at end of each of these transepts a chapel. The Church of SS. Annunziata, Florence, is rendered imposing by the large rotunda added to the church by Leone Battista Alberti; this is surrounded by apsidal chapels, and crowned with a frescoed dome. It is much to be regretted that, owing to the lowness of the arch into nave, the dome loses a great deal of its internal effect, as it cannot be seen unless from quite near the rotunda. Pavia Cathedral is said to have been designed by Bramante; the fine central octagon is, however, incomplete; there is an apsidal choir and aisles, but only two bays of nave are built. To Bramante is also attributed the erection of Sta. Maria della Campagna, at Piacenza, a church having an effective plan, based on a Greek cross; the arms are square-ended and barrel-vaulted, a domed lantern covers the centre, and smaller lanterns the corner chapels. Sta. Maria dell' Umiltà, at Pistoja, is the work of a pupil of Bramante, but the master is credited with the design. It is a large octagonal building, covered with a dome, and is preceded by a large and effective barrel-vaulted vestibule, having a cupola in the centre. The Madonna della Steccata at Parma is after the model of St. Peter, Rome, a Greek cross with apsidal-ended arms, a domed lantern in centre, and domed octagonal chapels at angles. Sta. Giustina, Padua, the work of Andrea Briosco, is planned on a grand scale, there being eight cupolas besides the three domical vaults over nave. It has nave and aisles, with lateral chapels, the transepts and choir each terminating in three apses. The exterior of this, as well as so many other extensive churches, presents a dolefully bare appearance, owing to its incompleteness. Sta. Maria in Carignano, Genoa, commenced in 1555, is another church based on Bramante's original design for S. Peter, and occupies a commanding height above the sea, a

site worthy of a better exterior. Of the many works of Palladio, the churches of San Giorgio Maggiore, and the Redentore at Venice are perhaps the best known, the former on account of its prominent position on an island all to itself on the Grand Canal; the cruciform plan, with apsidal transepts and choir and central dome, make a good interior, though it sadly lacks colour. The Redentore has no aisles, but a barrel-vaulted nave, with apsidal-sided flanking chapels, and terminating in a large domed square with eanted angles and apsidal-ended domes. Another prominent church in Venice is Sta. Maria della Salute, erected in the middle of the 17th century, and consisting of a large domed octagon surrounded by an aisle with chapels, on the last of which is a domed square with an apse on each side. In the 17th and 18th centuries we see in Rome, Modena, and elsewhere, several instances of churches constructed in the circular, octagonal, and elliptical forms, as well as on the Greek cross, while Turin and Naples have each an example of a church built at the beginning of this century on the model of the Pantheon. These Renaissance churches possess some interest in their planning, if their architecture is not such as all admire, and the author confessed that the cleverness and ingenuity often displayed in some of these buildings frequently overcame his prejudices. Before leaving the subject of Italian churches he would refer to some exotics. The famous Church of San Francesco, Assisi, erected in the 13th century, was the work of the German architect Jacopo, and exhibits a decided Northern character, while Milan Cathedral, of the 14th century, is said to be the work also of a German, or of an Italian architect trained in Germany—certainly, it bears little resemblance to Italian work, whether in plan, proportion, or detail. Geneva Cathedral, in some respects, has an affinity to French work, and the 13th century Church of Sant' Andrea, Verceili, with its square-ended choir and buttresses, is supposed, with good reason, to be the work of an Englishman, though Mr. Street considers that the exterior shows no trace of any but an Italian hand. There is no example of the French chevet in Italy, the nearest approach being the choir of Sant' Antonio, Padua.

(To be continued.)

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE last ordinary meeting of the Institute for the present session took place on Monday evening, the President, Mr. John Whicheard, in the chair. The following gentlemen were balloted for and elected to membership:—As Fellows: Laey William Ridge (associate), Bedford-row, W.C.; Charles Baker (associate), Leicester; Isaac Barradale, Leicester; Henry Shenton, Leicester; Hugh Rounieu Gough, Queen Anne's-gate, S.W.; Campbell Douglas (President of the Glasgow Institute of Architects), St. Vincent-street, Glasgow; and Alexander Graham, Carlton Chambers, Regent-street, S.W. As Associates: Walter Alfred Dugleby, Napier, Hawkes Bay, New Zealand; Thomas Garratt, Shepherd's Bush; and William Owen, Deansgate, Manchester. As Honorary Associates: Capt. Thomas Bridges Heathorne, R.A., Wilton-place, Knightsbridge, S.W.; John B. Monckton, F.S.A., Guildhall, E.C.; Rev. Canon Edmund Venables, M.A., The Precentory, Lincoln; Rt. Hon. Sir William Robert Seymour Vesey Fitzgerald, G.C.S.I., Charity Commissioner, Warwick-square, S.W. The SECRETARY having read a list of donations to the library, Professor DONALDSON called attention to one of these, the "Life of Mr. J. B. Papworth," remarking that it was a biography of a valued friend of his. To a genial manner and a kind heart was added in Mr. Papworth a lively genius and practicable skill. He was one of the founders of the Institute, and devoted much attention to the preparation of the rules.

THE LATE PROFESSOR SEMPER.

The SECRETARY announced the deaths of Mr. Edward Brainerd Webb, F.G.S., M.I.C.E., an hon. associate; Mr. Horace Field, associate; and Herr Semper, honorary and corresponding member.

Professor DONALDSON read a short and appreciative memoir of the last-named member.

Gottfried Semper, whose death at Rome had just been announced, was, he said, an old and valued friend of his; for him he entertained a sincere personal regard, and for his talents a genuine admiration. The earliest notice of him was in an essay on Greek architecture, by Kübler, which appeared in the first volume of "Instituto Transactions," in 1836, in which reference was made to Herr Semper having traced a complete scheme of colour-decoration on all the Greek remains of the age of Pericles, and to his conjectural restoration of the temples, which was at that time regarded as very ingenious. Semper was born at Altona in 1803; he first studied law in the University of Göttingen, and then turned his attention to architecture, subsequently pursuing his studies at Munich and at Paris. He afterwards visited Italy and Greece. In 1831 he published his first essay on architectural subjects, and in the same year was appointed Professor of Architecture in the University of Dresden, on the recommendation of Schinkel. About 1841 he prepared plans for the new theatre in that city, which was burned down in 1869—a work in the Italian style, which was noticeable from the refined and pure taste with which the plan was carried out in all its details. He executed much work in the city, and in 1847 began the new museum there. He was appointed architect to the King of Saxony, but in 1849 he allowed his irrepressible love of liberty to so far overrule his better judgment as to take part with the insurgents, and it was charged against him that he actually prepared plans of Dresden showing where the barricades should be erected. He was obliged to leave the city, and this was the commencement of a long series of years of misfortune. He went to Paris and afterwards came over to England in order to find security, and in search of possible employment. In 1852 he obtained an appointment in the Department of Practical Art at South Kensington, and delivered lectures on the decoration in colour of materials of every kind. In 1853 he made sketches for covering the site of South Kensington Museum with buildings, for which he was paid by the Prince Consort. He also designed the art certificate of the Department. After spending a few years in this country with his family, he was at length offered and accepted the post of Professor of Architecture in the University at Zurich. In the city he carried out many important works, including numerous buildings in the Upper-town, the Polytechnic School, and especially the very fine railway station. In this last building, the internal halls are conceived in the style of the thermæ of the Romans, and the decorative features are admirable. In 1866 Semper represented Switzerland, as Commissioner, at the International Exhibition at Paris. He designed the Swiss buildings in the exhibition, and took the opportunity of carrying out his theory of decoration by colouring them a bright red. In 1871 he was commissioned to rebuild his theatre at Dresden, destroyed by fire two years previously, but the principal work was practically carried out by his son. In 1869 he had made designs for a new exchange at Vienna, and in 1870 he was called upon to select a design in the competition for a new museum in Vienna, and eventually carried out the building in conjunction with the architect whose design he recommended. He settled in Vienna, and erected many important buildings there, including material additions to the Imperial residence. His closing years were not happy, as he was afflicted with asthma; he spent his time alternately in Venice and Rome, and died in the latter city on the 15th May, in the 77th year of his age.

Mr. WYATT remarked that Mr. Brainerd Webb, whose decease had also been announced, was for many years a civil engineer practising in Dublin; he was formerly the engineer of the Dublin and Coleraine Railway. He joined the Institute as an Hon. Associate last year. On the motion of Messrs. Barry and Wyatt, a cordial vote of thanks was accorded to Professor Donaldson for his paper.

THE RECENT EXCAVATIONS OF THE ROMAN FORUM.

Mr. EDWARD L'ANSON read a paper on this subject, which is reproduced on page 673.

After the reading of the paper, Professor Donaldson, and Messrs. E. C. Robins and C. Forster Hayward expressed their concurrence in the views expressed. In reply to questions, Mr. L'ANSON traced on the map the excavations now being carried on at the east side and south end of

the Forum at the cost of the Italian Government, under the direction of Cavaliere Rossi, who is preparing an elaborate work on the Forum. He also mentioned the very thorough manner in which Mr. John Henry Parker is carrying on his investigations, at very considerable personal expense, but said he could not agree with the conclusions of the latter author. A cordial vote of thanks for his paper was passed to Mr. L'ANSON, at the suggestion of the President.

THE ARCHITECTURAL ASSOCIATION AT ST. ALBAN'S ABBEY.

THE members of the Architectural Association paid a visit to St. Alban's Abbey on Saturday afternoon. Several accidental circumstances—the absence from the city of Mr. Scott, as well as of Mr. John Chapple, the clerk of works, who had been expected to conduct the party, a special service arranged for five p.m. in the central portion of the abbey, and not least the heavy and persistent rainfall of the latter part of the day—contributed to deprive the excursion of some anticipated pleasures, but the fifty or sixty members present made good use of the three hours they spent in the abbey. The President-elect, Mr. S. Flint Clarkson, according to a general request from the members, undertook at short notice the duties of *cicerone*, and in his peripatetic lectures evidenced an intimate acquaintance with the history and features of the abbey, and advanced independent theories as to the dates and causes of the numerous alterations in plan and design, which render the youngest and longest of our cathedrals so deeply interesting an architectural patchwork. Starting in the western portion of the nave, now partitioned off and used as a workshop and storehouse during the erection of the new roof, Mr. Clarkson expressed his opinion that the Norman Abbey of Paul de Caen, consecrated in 1115, was shorter by the four western bays than the present building, but that the present deep and wide transepts were original. At the east end it probably terminated in an apse, and at the west end in three apses. It had been supposed that the massive, unpierced south wall of the western bays of nave was of Norman origin, but he could see no evidence for or against this in the masonry. He then traced step by step the progress of the work; the Early English bays of John de Cella, Trumpington's alterations, the catastrophe of 1230, when the eastern arm of church fell, the rebuilding and extension of the Lady chapel, the reconstruction of portions of the south side of nave in the Decorated period, but on the Norman proportions, the insertion of later windows and other alterations. The mode in which successive generations of builders altered older work to suit their own ideas, and cut down the carvings and mouldings when pressed for means, was pointed out in a clear manner. Proceeding to the eastern extension of choir, Mr. Clarkson showed how curiously the 13th Century builders dealt with the difficulty of forming three deeply splayed openings from the choir into the Lady chapel within the width of the central span of the church without interpenetration of the mouldings at the angles or sacrifice of space. The way in which the mouldings of these arches were managed was awkward and complicated and anything but satisfactory, and compared disadvantageously with the treatment of a similar problem on the north side of ante-chapel, where the lines of the members are permitted to cross each other. In the retro-choir, the angle wall shafts spring from twisted corbels of unique form. The principal hollows of the mouldings of these arches are stopped by a chamfer block of enriched character, a not unusual expedient in early work, and thus the unsightly setting back of the arch immediately over the cap is avoided. In this retro-choir the arches of the triforium are out of proportion to the slender columns, and the very large roll of the shafts scarcely harmonises with the caps and bases. It was evidently intended to vault this portion of the building in stone; the shafts and springers were carried up, but the whole was subsequently finished in wood, with very little injury to the architectural effect. The history of the finding of the 2,000 fragments of St. Alban's shrine, built into a temporary wall between the retro-choir and ante-chapel, and its reconstruction by Sir Gilbert Scott, was narrated, Mr. Clarkson observing that

the Mediæval artist who designed this reliquary did not hesitate to colour the church tracery to harmonise with the Purbeck marble shafts. Passing into the Lady chapel, for the past three centuries used as a grammar school, but now in course of restoration, the exquisite character of the Early 11th Century architecture of the upper portion was pointed out. It was shown that the portion below the window-sills was almost half a century earlier in character. The windows, which of course belonged to the later work, are of great elegance and refinement. On the jambs are unique carved figures, set at regular intervals, with traces of diaper and scroll colouring above. The mullions are gradually reduced in thickness to the head, so that the transition to the thin pieces of tracery is very gradual; this *finesse*, which only came into vogue when contraflexure was adopted, is not observed in the otherwise graceful south-east window of the ante-chapel, the consequence being that the cusped circle of tracery seems to be a subsequent insertion. Some discussion took place as to the date of the central window on the south side of the Lady chapel, Mr. Page suggesting that it was a Perpendicular insertion, while others thought that all but the central tracery of the head was 14th century. Returning to the ante-chapel, the rich and greatly mutilated arcading on the south side and eastern return was admired, general regret being expressed when it was stated that the Restoration Committee propose to renew it in the spick-and-span, mechanically correct style of the north side if funds can be obtained for the purpose. In the north aisle of choir a halt was made opposite Abbot Ramryge's tomb, which forms a chantry chapel. Mr. Clarkson showed how the solid wall was cut away in the 15th century in order to insert this immense screen of stone tracery, with the result of endangering the safety of the tower. The abbot's rebus, a ram leaping, was incessantly repeated throughout the design, while, quaintly enough, every cusp in the tracery was incurved into the peculiar twist of a ram's horn, and, said Mr. Clarkson, one could imagine the chuckle with which the designer must have witnessed the carving and setting up of each successive volute in this gigantic pun. We cannot follow Mr. Clarkson in this matter of the cusping. Opposite this, on the outer aisle wall, was the delicate 13th Century arcade of which a recent lecturer at the Association (Mr. James Neale, F.S.A.) had stated he had collected and collated seven or eight drawings, all of which differed from each other. The explanation, said Mr. Clarkson, was simple: the arcade was uniform in scale, but the lines and drawings of the columns and arches were not uniform either in design or execution. As a consequence no two bays were precisely similar, but the various draughtsmen, after having measured one bay, have failed to observe this variation, and have made the others uniform with the one copied. Entering the choir, the mode in which the heavy Norman work had been lightened by subsequent architects, though they dare not cut through the masonry lest the tower should be imperilled, was indicated. The 13th century architects cut-back arcades on the face of the walls, and to get more play, omitted the cap of the main shafts, while giving fully developed eaps and bases to the return shafts on either side. Panelling was added by later architects with the same aim. The 15th Century panelled altar screen is a very fine one, and so nearly resembles that at Winchester that they have been erroneously supposed to be replicas. Returning to the south transept, the ingenious mode in which William de Trumpington strove to remedy its darkness by piercing new windows above the level of the adjacent cloisters, and, therefore, above the triforium, was pointed out, Mr. Clarkson showing that where the eills of these splayed lights impinged on the triforium a new and shorter column with modified cap had to be designed and placed in the row of balusters. The party then went to the central western porch, the extreme beauty of the Early English mouldings in this being referred to; Sir Gilbert Scott had, indeed, declared this work to be unequalled for grace and elegance in any portal of the period, and only approximated to in the Galilee at Ely. The mode in which William de Trumpington, in completing John de Cella's work in this porch, cut down and modified the design gave rise to a little discussion as to the relative merits of the two schemes, the general opinion being in favour of the older work. It

was shown that the masonry which Trumpington found already prepared were used, as far as it went, in accordance with the new ideas, but with less elaboration of parts, the Purbeck shafts being simply omitted. The other porches were also looked into, it being demonstrated that the triplet of portals could never have been intended to intercommunicate, as Sir G. Scott thought before opening up the ones on the north and south, as the flanking lines did not meet. The foundations of the tower once proposed on the south-west side having been examined, Mr. Clarkson said that Sir Edmund Beckett had proposed to pierce this south aisle wall, now solid, with windows. It was admitted that no windows could have been opened here in pre-Reformation days, because the monastic buildings abutted on this portion of the abbey; but Sir Edmund held that if Mediæval builders had seen them removed they would not have scrupled to open out lights. Mr. Clarkson suggested that any if one candidly supposed that this portion of the church, faced as it was by the immense west window, and having north aisle and north and south clerestory lights, was insufficiently lighted, he must be difficult to convince. The re-roofing of this western portion of the nave, it was seen, was actively progressing. Piles of deal worked into principals bestrew the central area, and there are also stacked near the entrance some hundreds of leaden pigs for the covering in, which it was stated it has been decided shall be of lead. Some of the painted wooden panels temporarily removed from the ceiling were examined; they are of 3 oak, coarsely painted by hand with conventional scroll patterns, and a lion *passant* or *regardant* at the four corners of each device. This boarding is generally in a good state of preservation, but it is fragmentary, and the mode of storage during the alterations does not err on the side of vigilance. Heedless of the heavy shower, the members went outside the Abbey, while Mr. Clarkson stated the case for and against the raising of the pitch of the roof, showing that the advocates of the high-pitched roof based their plea to some extent on the grooves still apparent on the brickwork of the west face of the tower, while the other party had declared that these were merely masons' lines, and that Roman tiling unscored and apparently of the original bonding-in intercepted these grooves. Mr. Clarkson was pressed as to his view of the controversy, but this he declined to state, saying the facts as well as the arguments were before the members' eyes. Many of the principals have already been raised to the roof, but none are as yet set up. In walking round the Abbey satisfaction was expressed that the old pathway through the Lady Chapel had been diverted to the east of the building. It was found impossible, owing to the incessant rain, to complete the external survey, but before separating a hearty vote of thanks was passed, on the motion of Mr. Blashill, to Mr. Clarkson for the genial and instructive manner in which he had discharged the rôle of guide, philosopher, and friend.

Amongst the numerous illustrations of St. Alban's Abbey, which have appeared in recent volumes of the *BUILDING NEWS*, we enumerate the following as those of chief interest:—General plans of monastic buildings, Feb. 25, 1870, and Feb. 8, 1878; another of the Abbey and adjacent buildings to large scale, June 21, 1872; perspective views of Abbey from S.W., Feb. 18, 1870 (Sketchbook Series, No. 19); and from S.E., Sept. 22, 1871, and May 21, 1878; bays, north side, nave, May 17, 1878; central west porch, Sept. 16, 1870 (Sketchbook Series, No. 43); carvings in N.W. porch, &c., Dec. 28, 1877; an interior doorway, July 22, 1870 (Sketchbook Series, No. 37); Duke Humphries' tomb, Feb. 23, 1877; the slype, Feb. 23, 1877; and sections of old and new roofs of nave, Dec. 6, 1878, and Jan. 3, 1879.

CHAPEL ARCHITECTS.

ARE-PERUSAL of Mr. Cubitt's well known book, "Church Designs for Congregations," has led the editor of the *Freeman*, the leading Baptist organ, to give the following fancy sketch of the way in which Dissenting chapels are sometimes built:—

"First, a committee is appointed, chiefly of men wholly unacquainted with the work before them. Contributions come in well. The power of the voluntary principle is illustrated. The

committee meet and talk over what is before them. There is no disagreement as to what they require, but very little agreement as to how it can be secured. Deacon A., who has never done such a thing before, sketches a plan in pencil. It is an oblong building, fifteen feet by forty-five feet; he thinks it would seat about 900 on the ground floor, and that side galleries could afterwards be added. Brother B. has sat up all night with some red and black paint, and produces a cruciform building like a cathedral, with two rows of piers shutting out the view of the pulpit from numbers; he altogether overlooks the need of a porch, and places the schoolroom under the chapel, making no provision whatever for lighting it. Another member gets his daughter to draw out a sketch of a Wesleyan village chapel, very pretty, but with the windows overlooking a neighbour's ground, all of which would be blocked up at once. The committee discuss and discuss with considerable development of patience and temper. At length a neighbouring gentleman sends a promise of £10, and strongly recommends a friend of his own who, he says, is a rising and gifted architect, and would undertake the work for half the regular fees. The architect sends for inspection a number of pictures he has drawn, and, being tolerably clever at water-colour drawing, they look well. He is invited to meet the committee. "What kind of a building do you need?" he asks. Says Deacon A., "We want a good, substantial building, with none of what I call frippery; no useless ornamentation, no foolish pinnacles and what not; but a plain, handsome place, that shall be an ornament to the town." "Exactly so," all the others respond. The architect, if feeble in skill, is shrewd enough to measure the meaning. He sees they know nothing about it. For who ever wanted a building that was not good—that was not substantial? Who ever wished for frippery and foolish ornaments? Who would not be delighted to secure a place that should be plain and handsome, cheap, and yet an ornament to the town? So the architect engaged them for half an hour in technical expressions. Very soon they were all out of their depth and overwhelmed with his learning and genius, and he left them promising a design on approval. Within a week the design came. Purposely it had some very obvious defects. The pulpit was six feet two high, and the vestry door very awkwardly placed. The committee were dazzled with the first sight of the well-painted picture. Deacon A. suggested that the pulpit should be lower. Another thought the entrance to the vestry could be altered with advantage. The architect flattered them on their penetration, altered the design, cut off some two pinnacles (which he had never intended to keep on the plan), said that these alterations would diminish the expense by some £500, and the design was accepted and signed. The contract was taken by a builder who saw at once what was to be done. He knew well the measurements would never do; the strength was all in the wrong places. As he went on with the work this became evident enough; had he completed it the roof would assuredly have fallen in. From the time this became apparent, the architect and builder understood one another, and pulled through pleasantly together somehow. The result was a well-built place without any frippery, and most people were satisfied. The porch was Saxon; the side windows were Early English; on the south, opposite to the pulpit, was an immense Perpendicular window, summarily to bring the sermon to an end by blinding the preacher at noonday; the vestry was Tudor, and the gallery was supported by Doric columns; an Italian lantern crowned the whole. As for draughts and acoustic arrangements—well, they were trifles left to take their chance. It was a fact that a noble place, in pure style, could have been built for the same sum of money. Principles of comfort and hearing might have, without extra cost, formed part of the plan. But nothing was contributed to the knowledge or increase of taste in chapel architecture."

The following buildings are now in the course of erection, from the designs and under the direction of Mr. John Hillary, architect and surveyor:—Longparish, Hants: new house for R. Dowling, Esq., at Andover, Hants; Messrs. Annett and Son, builders, Andover; amount of contract, £949 7s. New house for H. Dowling, Esq., at Andover; Messrs. Annett and Son, builders; amount of contract, £1,200. New farmhouse for H. Harris, Esq., at Stevenon, Hants; Mr. G. Batten, builder, Overton, Hants; amount of contract, £900.

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NEW VESTRY HALL, BROMLEY.—CABINET DESIGNED FOR MARSH, JONES, AND CRIBB.—ST. GREGORY'S MONASTERY, DOWNSIDE.—HOUSES IN NIGHTINGALE-LANE, WALWORTH.—CITY OF GLASGOW BANK, GLASGOW.—NORFOLK AND NORWICH HOSPITAL.

OUR LITHOGRAPHIC ILLUSTRATIONS.

BROMLEY VESTRY HALL AND PAROCHIAL OFFICES.

The foundation-stone of this building was laid on the 24th May, 1879. It is intended to accommodate the vestry and its officers. The site is in the Bow-road, where formerly stood Mrs. Bowrey's alm-houses, in the parish of Bromley St. Leonard, Middlesex. The frontage of the building is 53ft., and is to be faced with Portland stone. The rooms provided are, on the ground floor, committee-room, rate collector's office, vestry clerk's offices, vestibule, and entrance hall, leading to a stone staircase, which gives access to the vestry hall, which is 48ft. by 32ft., and occupies the whole of the first floor of the front or main portion of the building. In the rear portion of the building are first and second stories, containing a waiting-room, and here are housekeeper's apartments, approached by a separate staircase. In the basement is a fireproof muniment room. The builders are Messrs. J. and H. Cocks, of Mile End, E., whose contract is £5,266. The designs are by Messrs. A. and C. Harston, 15, Leaden-hall-street, E.C.

CABINET FOR MESSRS. MARSH, JONES, AND CRIBB.

This cabinet is to be executed in American walnut, with carved black wood panels, and some of the mouldings relieved with ebony from design and details furnished by Messrs. F. and A. Wheel-don, architects, Birmingham and Wolverhampton.

ST. GREGORY'S CHURCH, MONASTERY, AND COLLEGE, DOWNSIDE.

We publish to-day a bird's-eye view from S.E., together with plan, of the group of monastic buildings erected for the English Benedictines at Downside, near Bath. Messrs. Dunn and Hansom are the architects. The plan of the monastery is an attempt to revive something of the arrangements carried out in mediæval buildings. A perspective of the exterior of the church and the library, taken from the south-east, appeared in the BUILDING NEWS for May 30,

1873, and another of the interior of the church on October 16, 1874. The drawing now reproduced is hung at the present time at the Academy.

HOUSES AT WANDSWORTH.

THESE houses which we illustrate this week from the pen and ink drawing now on view at the Royal Academy Exhibition are being built in Nightingale-lane, Wandsworth, by Mr. Jennings, the sanitary engineer, who is his own builder in this case. The buildings were originally intended to be faced with Tisbury stone, but the detail has been slightly altered from the first design to allow of the work being carried out in red brick and terra-cotta. The terra-cotta is being made by Mr. Jennings at his works at Parkstone, and is of a buff colour. The sanitary arrangements of the houses will be on as perfect a model as can well be conceived, all Mr. Jennings's latest improved apparatus being employed, and the same may be said of the heating of the halls and staircases, as well as the ventilation throughout, all being in the proprietor's own method. Mr. T. E. Collent is the architect.

CITY OF GLASGOW BANK—NEW HEAD OFFICE, GLASGOW.

THE building which forms the subject of the illustration was in course of erection, and nearly completed, at the time the Bank stopped payment in October last. It has since been completed and roofed in at the level of the main cornice, but the work above this stage will not now be done. The material used for the building is from the Overwood Quarries, with a granite base up to the height of the street floor sills. The architects are Messrs. Campbell Douglas and Sellars, Glasgow.

NORFOLK AND NORWICH HOSPITAL.

THIS building, the foundation-stone of which is to be laid by the Prince of Wales on the 17th inst., is now in course of erection. The original Norfolk and Norwich Hospital was built in the year 1771, and for long had the reputation of being one of the best arranged buildings of its kind in the kingdom. Of late years, however, it has been found insufficient in accommodation, and altogether unsuited to the requirements of modern medical science. In 1876 a scheme was set on foot for the enlargement and remodelling of the old building, which at once received the most cordial support of the Prince of Wales and the leading inhabitants of the city and county, and plans were prepared by Mr. E. Boardman, of Norwich, architect to the hospital, showing how these improvements might be effected. As, however, the subscriptions to the "Hospital Restoration Fund" exceeded expectation, and it was found to be impossible to adapt the old building successfully to modern requirements, the governors eventually determined to build an entirely new hospital. The new building is being erected partly on the site of, and partly on the grounds belonging to the old hospital, and is arranged on the separate pavilion principle, connected by corridors, as shown by the ground plan. A portion of the old hospital (on the north-east side of site and nearest to the city) is retained, and is to be rearranged and enlarged so as to contain the out-patients' department, museum, &c., on the ground-floor, together with a nurses' home on the 1st and 2nd floors, communication with the new building being provided by means of a covered way. The pavilions are two-storied buildings, the 1st floor of each being exactly similar in arrangement to the ground-floor, a 2nd floor being formed over the central portion of each, to contain bedrooms for the female servants of the establishment. The central compartments between the large wards, contain the principal staircases (giving access to the upper floors), nurses' rooms, sculleries, &c. The administrative block, which is placed in the centre of the new building, contains on the ground-floor, board-room, library, surgery, large waiting-hall, &c.; on the 1st floor, resident medical officers' sitting and bedrooms; and on the 2nd floor, bedrooms for pupils and men-servants. The kitchens, servants' offices, and store-rooms are placed in the basement of this block, round which are large areas and open spaces giving abundant light and ventilation to the basement story. Behind the administrative block is placed the Operating department, effectually separated from the noise and traffic of the rest of the hospital; it contains a spacious operating theatre, with

several small wards arranged round it for special surgical cases. The chapel, which will accommodate about 110 persons, is placed at the N.E. corner of the site, and is connected with the main building by a vestibule. The new building is being executed in local red bricks, Cossey bricks being used for the moulded and ornamental portions, with stone dressings sparingly introduced, the roofs being covered with Broseley tiles. All the internal woodwork is to be of pitch-pine varnished, and the fittings throughout will be of the best and most approved description. The chapel, corridors, staircases, waiting-rooms, &c., are to be heated by hot-water coils, the large wards being heated by Mr. H. Saxon Snell's patent "therm-hydric stoves," and the small wards by means of open fireplaces. The ventilation will be effected by means of extracting flues in the ceilings of the different rooms, connected with large exhaust shafts in the roofs (heat being the extracting power), to remove the vitiated air, fresh air being introduced through gratings at the floor level. Great attention has been paid to the sanitary arrangements throughout the building. The height, from floor to ceiling, of all the wards and principal rooms throughout will be at least 14ft., that of secondary rooms varying from 9 to 12ft. The total number of beds provided for in-patients is 200; accommodation is provided for 8 medical officers and pupils, 30 nurses, and 10 domestic servants, together with matron, housekeeper, and secretary. The minimum cubic space per bed allowed for ordinary wards is 1,500 cubic feet, and for surgical wards 1,900 cubic feet. The cost of the building, including chapel and the alterations to portion of old hospital, may be taken at £46,000, of which sum about £36,000 has been already subscribed or promised. At present only a portion of the building, comprising the S.W. pavilion with the administrative and operating blocks, is being erected, the principal portion of the old hospital being retained for use until this part of the new building is ready for the reception of patients, by which time the committee hope to have received sufficient subscriptions to enable them to carry out the whole scheme. The works are being executed by Messrs. J. and W. Lacey, builders, Norwich, the designs having been prepared by Mr. Thos. H. Wyatt, of 77, Great Russell-street, London, and Mr. E. Boardman, of Queen-street, Norwich, joint architects.

CHIPS.

A new lecture-hall and schools in connection with the Congregational Church, Highfield Park, Rock Ferry, were opened on Thursday week. The new building has been erected on the south-west side of the church, and is in harmony with it, both having been built from designs by Mr. D. Walker, architect, Liverpool. The large lecture-hall, on the second floor, is 67 feet in length by 32 feet wide, and will seat 500 people. The ground-floor is divided into several school and class-rooms. The building is of Storeton stone, the dressings being of the same material. The works have been executed to Mr. Walker's plans by the contractor, Mr. James Bratt, of Rock Ferry, and the cost will be about £2,000.

A very unusual scene has just been witnessed in the village of Shapwick, Dorsetshire. The parish church has long been out of repair, and steps have been in progress for some time to raise funds to restore it; but difficulty has been experienced in getting sufficient money for the purpose. With a view of partially surmounting the financial obstacle, it was proposed and agreed that the unskilled labour in connection with the restoration should be done by the able-bodied men of the parish. Consequently, one evening last week all the Shapwick men, under the leadership of the vicar and the superintendence of the architect, assembled to perform their part, and they worked with such eagerness that at dusk everything had been done to prepare the building for the incoming of the restorers: all traces of gallery and pews had been destroyed, the flooring and paving stones carried out of the church, and the whole edifice reduced to the necessary skeleton-like condition.

The church of St. Mary, Mariansleigh, near South Molton, was reopened on the 30th ult., after restoration. Mr. W. C. Oliver, of Barnstaple, was the architect, and Mr. John Cock, of South Molton, the builder.

At the Putney Board of Works, on Wednesday week, it was unanimously resolved to increase the salary of the surveyor, Mr. J. C. Radford, £50 a year. The question was brought forward by Mr. Collier and Mr. Cutler, who spoke in high terms of Mr. Radford's energy and ability.

CITY OF GLASGOW BANK, NEW PREMISES, GLASGOW. CAMPBELL DOUGLAS AND SELLARS ARCHTS

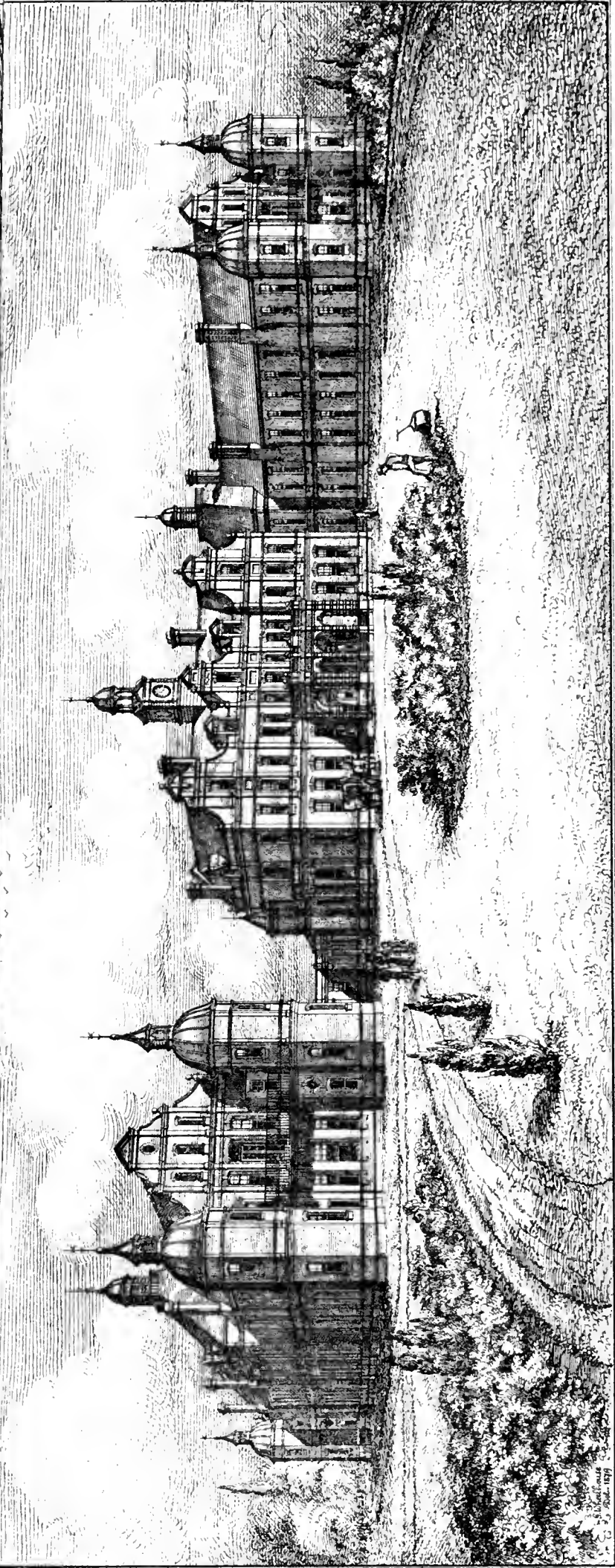
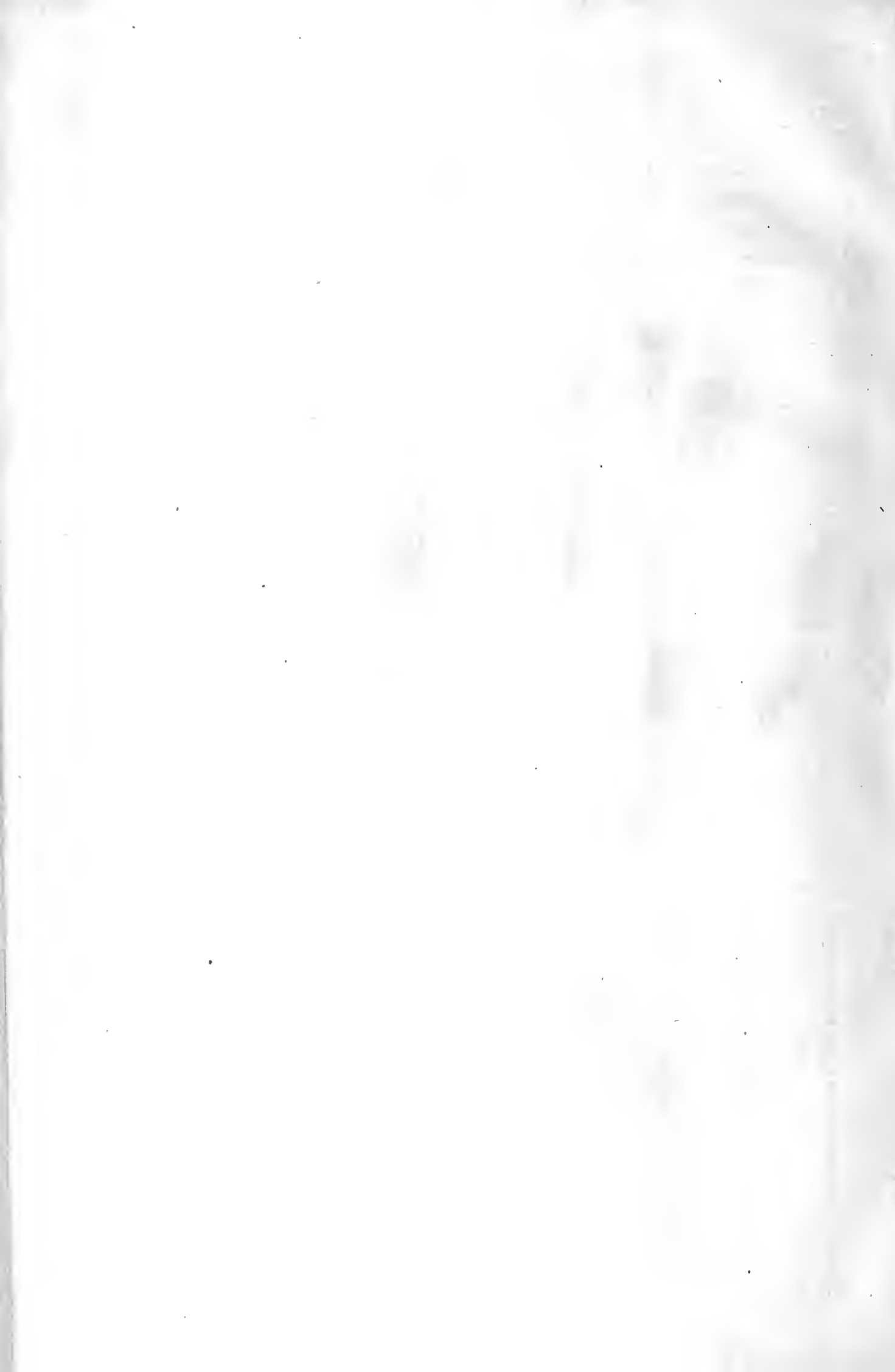
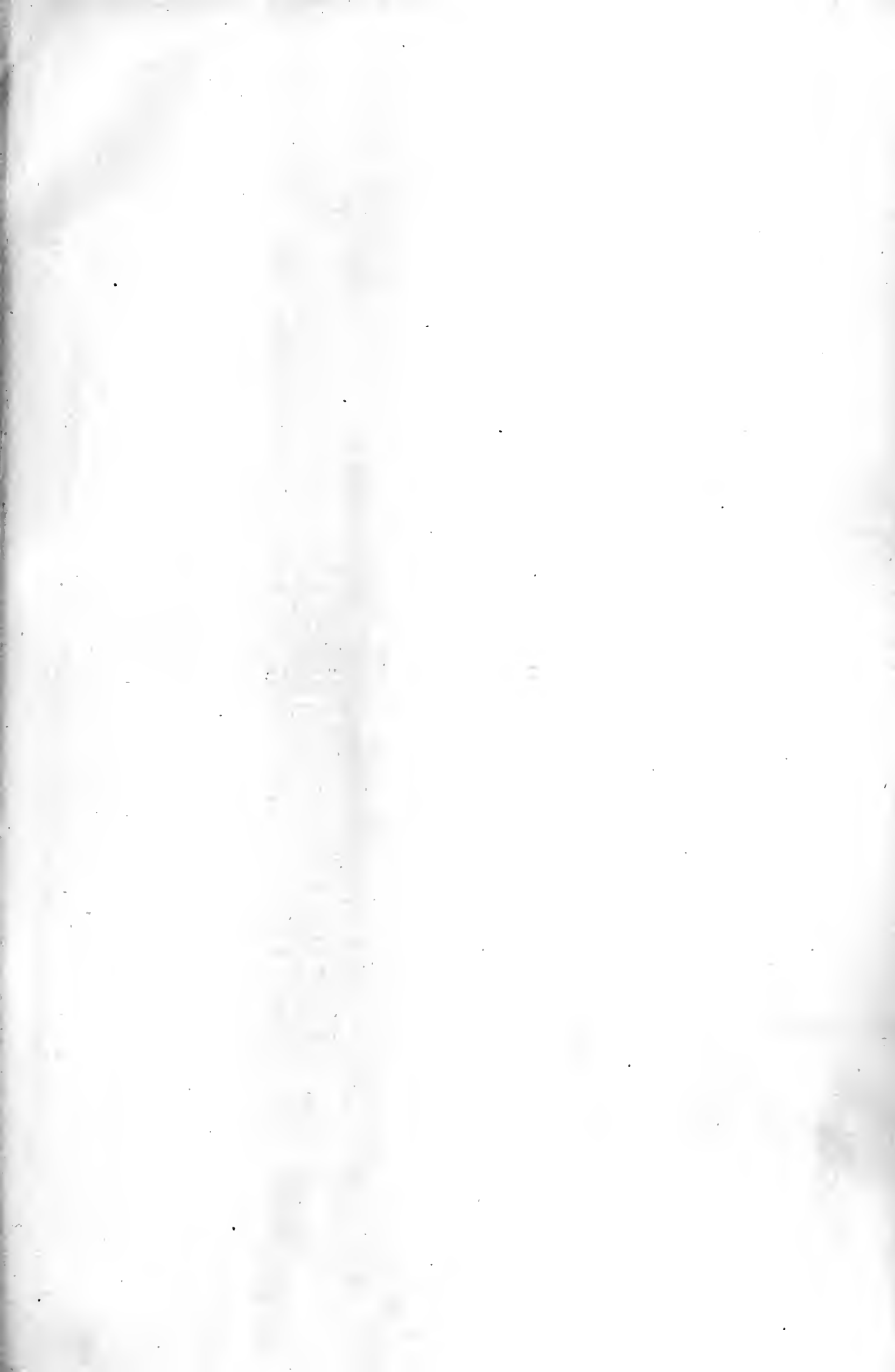


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— NORFOLK AND NORWICH HOSPITAL —
— PERSPECTIVE VIEW —

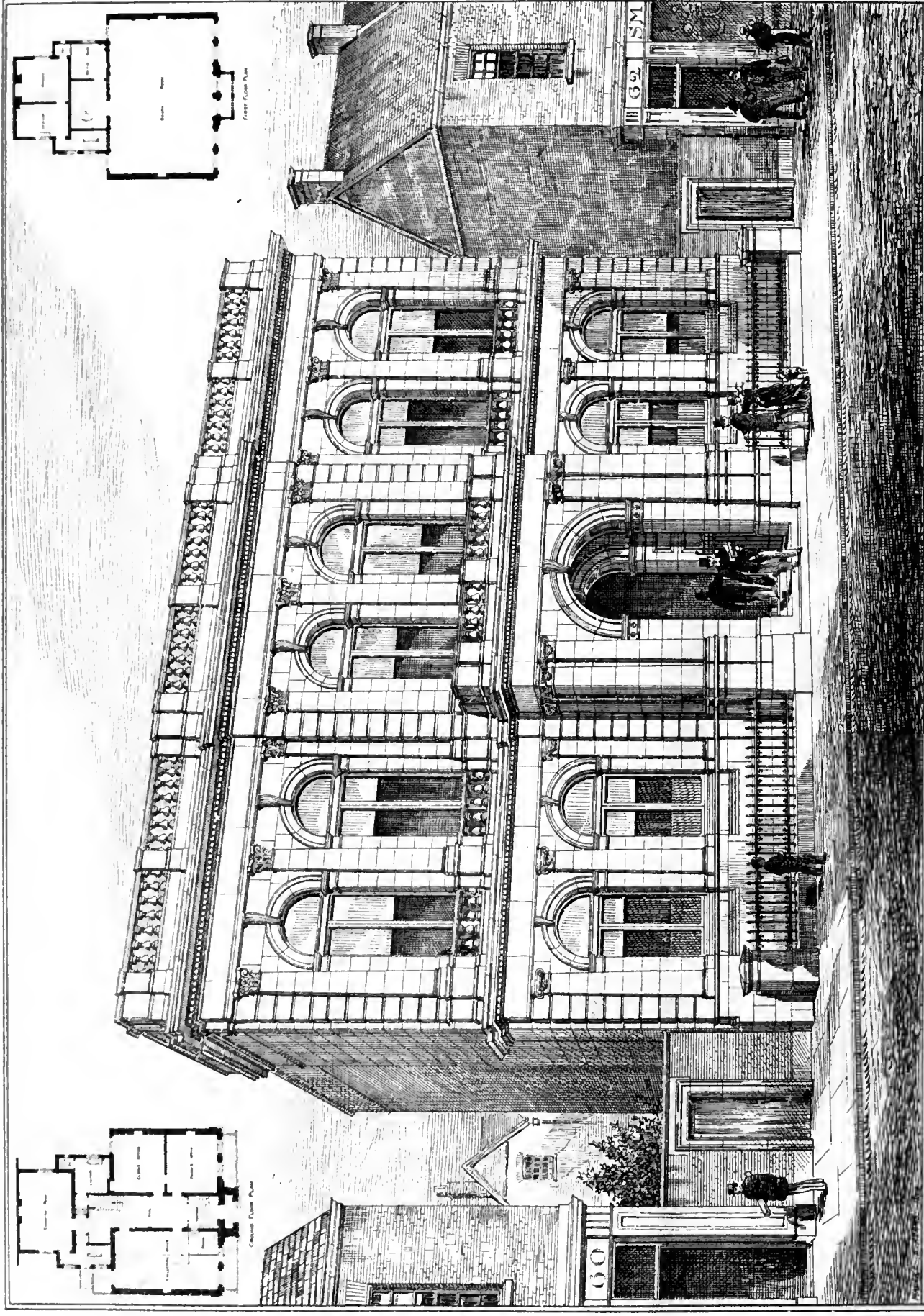
T.H. WYATT
&
E. BOARDMAN } JOINT ARCHITECTS







THE BUILDING NEWS, JUN 13 1879



PARISH OF BROMLEY · SAINT · LEONARD · NEW · VESTRY · HALL · MESSRS A · C · HARSTON · ARCHITECTS · 15 · LEADENHALL · STREET · LONDON · E · C · 3 · 2 · 1

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Cabinet Designed for Messrs Marsh Jones and Cribb :

And Alcockson Architects, Birmingham and Wolverhampton

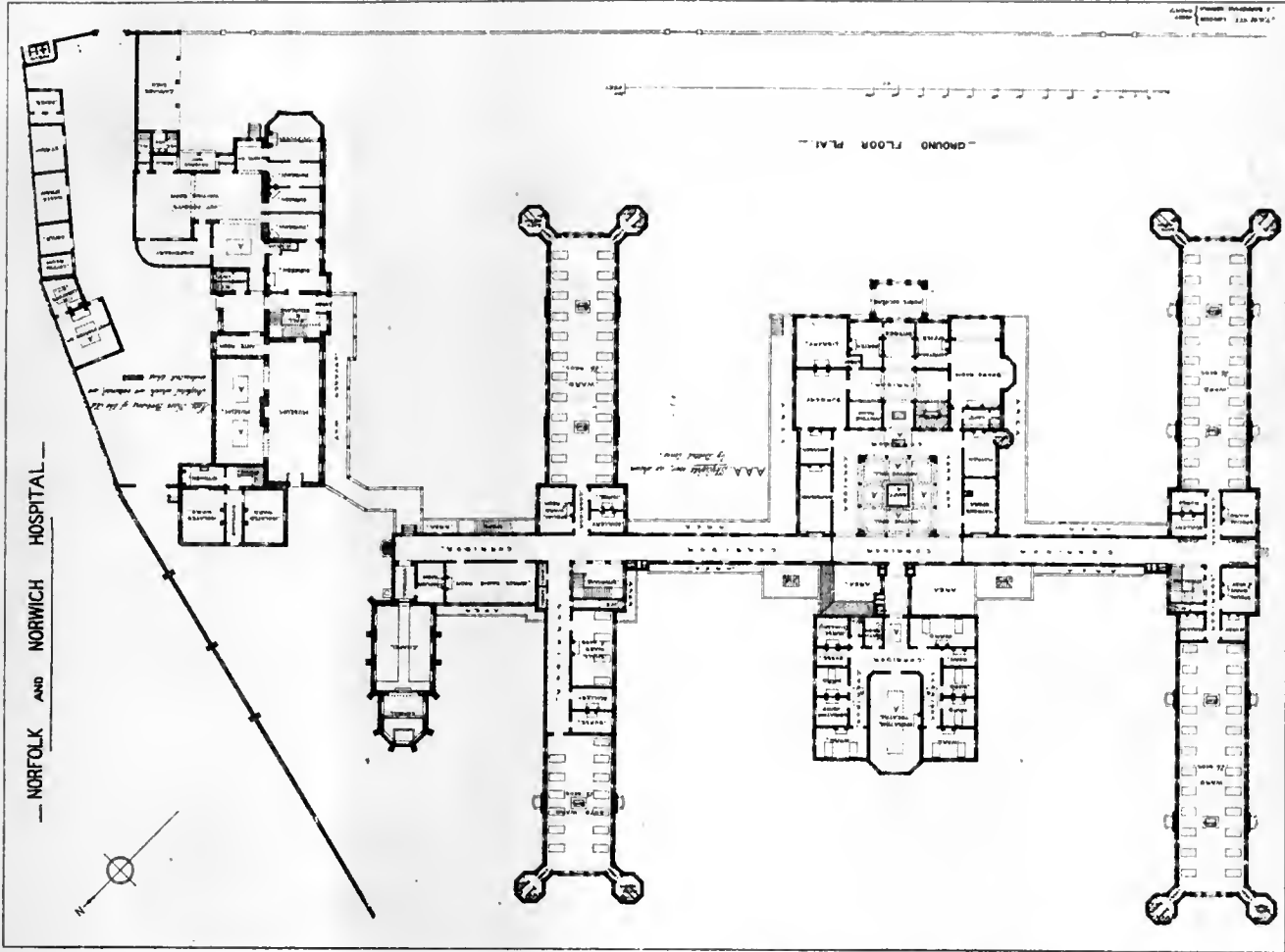
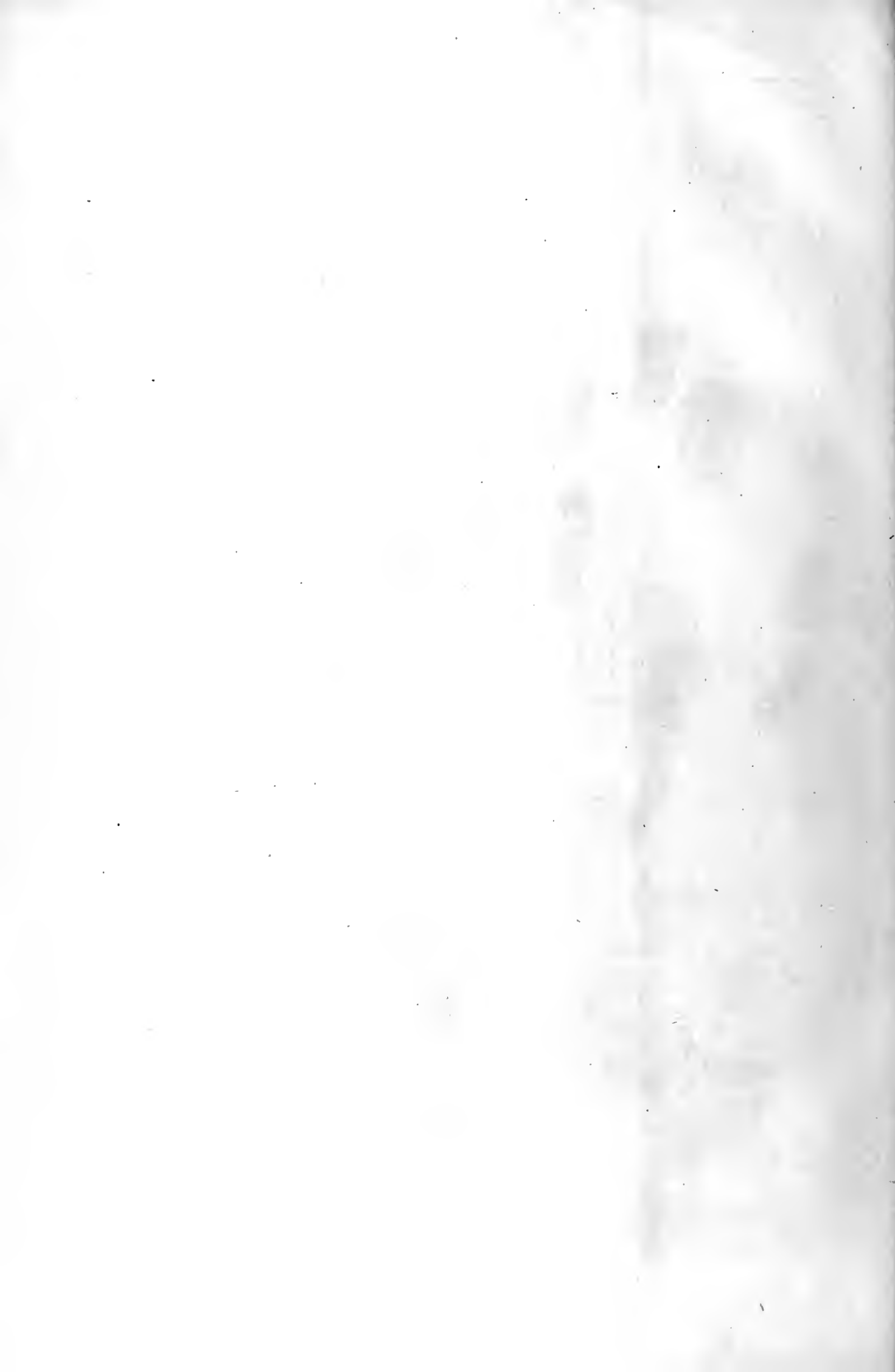
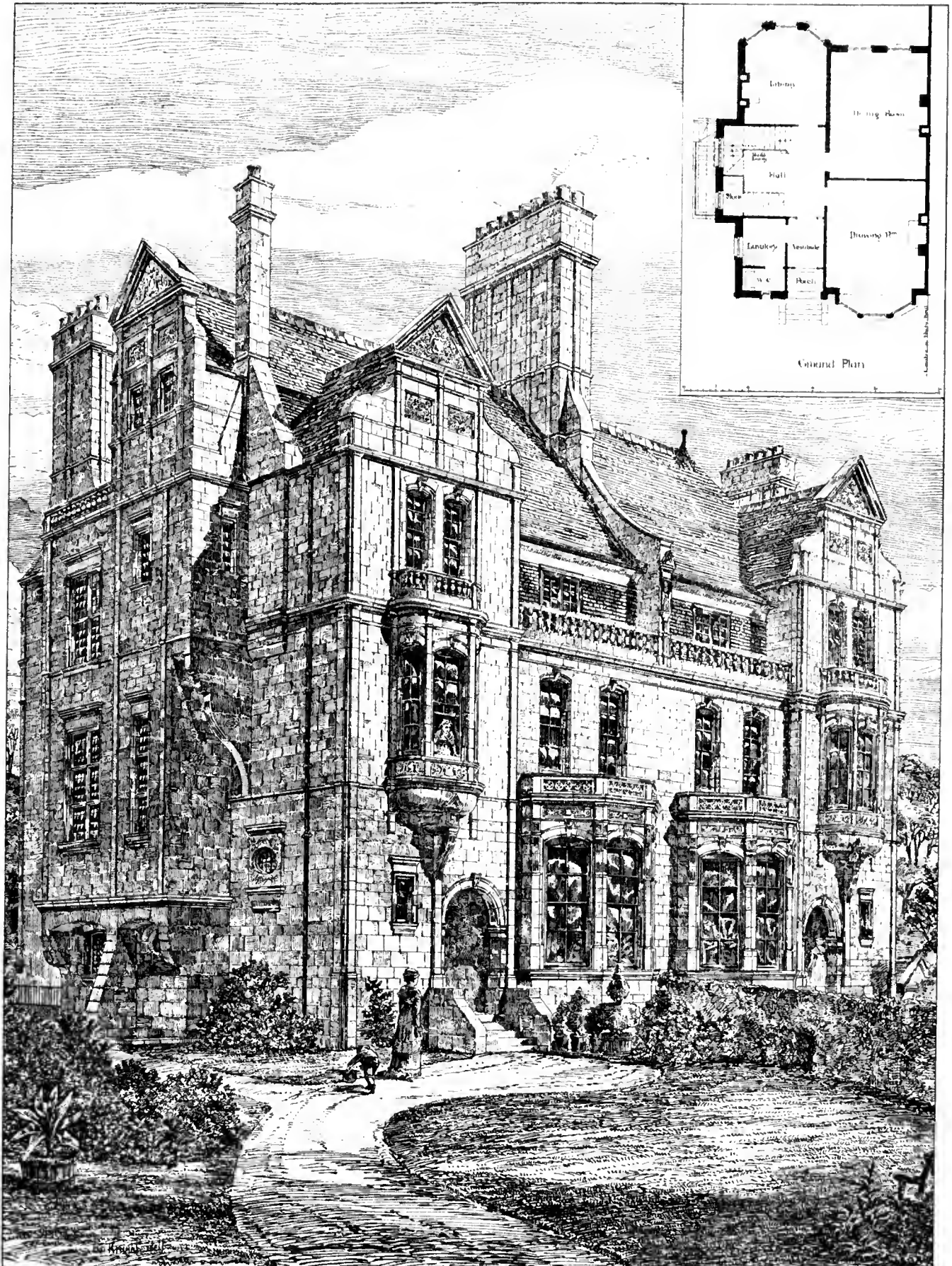


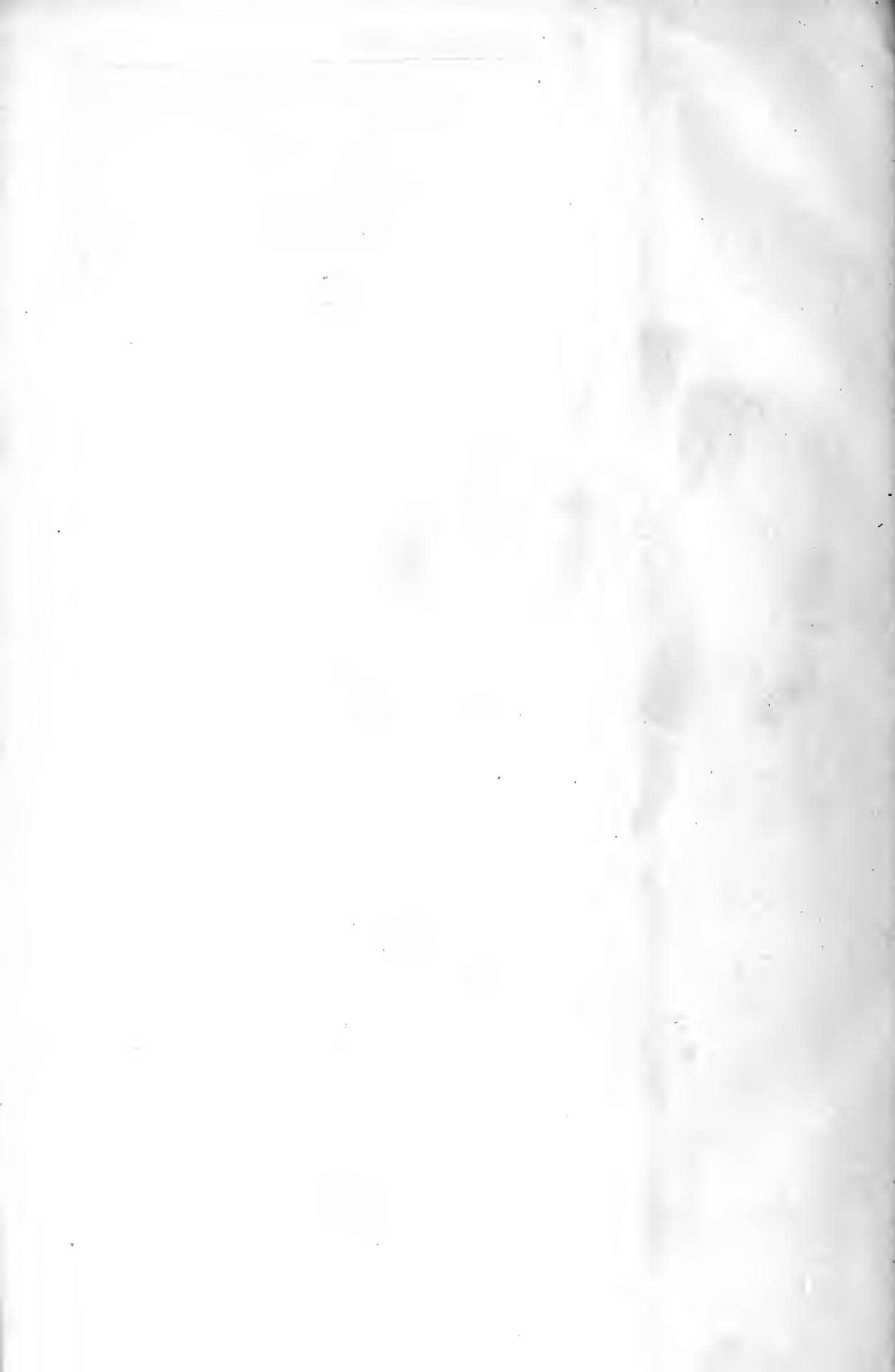
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HOUSES NIGHTINGALE LANE WANDSWORTH T.E. COLLCUTT ARCHITECT



THE RECENT EXCAVATIONS OF THE
ROMAN FORUM.*

ALTHOUGH the subject of the Roman Forum has been more than once discussed in this room, still it is a subject ever replete with interest, and as the excavations which have been going on during late years have disclosed facts and settled questions which have been matters of voluminous controversy amongst antiquarians and literary men for generations, having recently seen these excavations, I now propose to describe their present condition. I am neither an antiquarian, or versed in classic lore, so that all I purpose to do is to record what I observed, and to note the conclusions which others have drawn from the facts disclosed. When I first visited Rome my knowledge of the classic monuments it contained was derived from Taylor and Creasy's book, two interesting folio volumes, and such information as Mrs. Starke's Guidebook afforded, for it was before either the days of Murray's Handbook, or the learned observations in Bedeker's Handbook, that I paid my first visit. At that time the Roman Forum was a plain extending from the base of the Capitol to the Colosseum, and the monuments then visible consisted of the upper portions of two groups of columns known as the remains of the Temple of Jupiter Stator, now determined to be the Temple of Castor and Pollux, one group of Ionic columns, a considerable part of the podium on which they stand, and one single column which had been excavated to the base by the Duchess of Devonshire in 1813, and which in Byron's time was called the nameless column with a buried base. Besides these there was the triumphal arch of Septimius Severus at the north-west end of the forum, and this was all. I will now endeavour to describe to you the Forum as I saw it last November and December. I propose to follow the description, and in many cases the words, of the latest English work I can find written on the subject (Nicholls' Roman Forum), published by Longmans in 1877. Beginning, then, at the north-west end of the forum, we find a large building constructed on the south-eastern slope of the Capitoline Hill; much of the lower part of the building remains, it has been raised upon by Michael Angelo, and is now incorporated with the senatorial palace, of which the principal façade is in the Piazza del Campidoglio. The façade which is next the forum is very lofty, and forms a conspicuous object, constituting a considerable part of its north-western boundary. In this building was a long arcade, one half of which is now open with Doric half columns at the sides, and the capitals of several other columns; any considerable traces of the corrie indicating the continuation of the arcade may be seen embedded in the walls by an inscription which existed until the 17th century. This building is known to be the Tabularium or Public Record Office. Its destruction by fire is twice alluded to by Cicero; it was rebuilt by Quintus Lutatius Catullus, Consul, B.C. 78; some portions, however, must be of more ancient date, being built of tufa. The lower and ancient part, which is now used as a museum for the reception of the architectural gleanings arising from the excavation of the forum, is still in excellent preservation, although a portion used during the middle ages as a storage for salt has been much injured by its corroding action on the tufastone. Above the ancient part is reared the lofty buildings added by Michael Angelo. On the south-west side of the Tabularium is the principal road leading from the capitol to the forum called the Clivus Capitolinus. On the north-east side of the forum, under and against the Tabularium, are the remains of the Temple of Concord, the extensive podium of which, with its rich marble pavement, and some portion of the outer walls with its marble lining and plinth, still remain, particularly next the western angle. The building of which we see the remains appears to have consisted of a large cella placed against the wall of the Tabularium, with a portico of less width projecting towards the forum, the portico being approached by a lofty flight of steps, but none of the columns are left remaining. Between the cella and the portico are two wide marble cills, on one of which the door was placed, and on the cill of one—the mortices for the hinges or pivots on which the door hung are observable—is a shallow sinking in which the figure of a caduceus, probably of bronze, appears to have been imbedded.

When Varro wrote there seems to have been not only a Temple of Concord but a basilica called the Basilica Opimia on this ground, and in earlier times in the same locality a building called the Scaeculum also stood. Some antiquarians, I believe, now consider that this ruin did consist of two separate buildings. The first Temple of Concord placed on part of this site was probably that of M. Fricenes Camillus, B.C. 367. The temple existing in the time of Cicero and Varro appears to have been erected in the forum by L. Opimius, Consul B.C. 121. The edifice of which we see the present remains was, it is believed, undertaken by Tiberius during the reign of Augustus, A.D. 6, and dedicated after the triumphal return of Tiberius from his German campaign, A.D. 12. This temple was frequently used for the meeting of the Senate; it was to this place Cicero brought the accomplices of Catiline, and here he exposed the conspiracy, whilst the Clivus Capitolinus was thronged with the noblest of Rome. It was here that Caesar was threatened by the Roman knights, and it was here that after Caesar's death Cicero and the Senate defied Mark Antony. The base of the temple at the southern extremity is composed of rubble masonry, then follows a rubble wall, and at a still higher level is a mass of stone rubble work, forming no doubt the substructure of the steps leading from the level of the Forum up to the floor of the temple. Where the cella appears to join the portico are two large massive stones which apparently formed the cill of the door or doorways either of the cella or of two separate buildings. On the northernmost of the two cills are two deeply recessed mortice holes as though to receive the pivots or studs on which the door turned, and on the other cill is the matrix of what appears to have been a figure of the Caduceus, probably in bronze. The cella of the temple (or if it were so, the separate building next the Tabularium) is covered with marble paving, but the whole is much fractured. The back wall does not touch the wall of the Tabularium, but there is a small space between the two buildings. There are considerable traces of the marble lining of the walls at the south-west corner, and there are also ruins of a brick construction, the remains of a church of the middle ages built within the area of the ancient temple. On the wall of the Tabularium, at the back, or close to the back, of this temple, is an excavation through an ancient doorway, made, as I understand, at the expense of our veteran English archaeologist, Mr. Parker, to ascertain whether it formerly communicated with the interior of the Tabularium; but the excavation does not lead to this conclusion. In front of the ruin of the Temple of Concord stands the arch, which its inscription shows to have been erected in honour of the Emperor Septimius Severus and his sons Caracalla and Geta, but from which the name of the last was erased by order of Caracalla. The carriage way between the Temple of Concord and the north-west front of the arch of Septimius Severus is part of the ancient road leading from the Clivus Capitolinus to the prison, but the road branching from it and passing under the arch is probably not older, if indeed so old, as the arch itself. The Via Sacra runs steeply up to the arch of Septimius Severus, and just within the modern roadway is a large altar base and a square altar. The north side of the arch is very ruinous, and there are several mortice holes for the insertion of timber, but the south side of the arch is in much better preservation. The central roadway through the arch is paved; after passing through it turns sharply to the south-west, and the paving is very dilapidated; the footways through the arch are paved with square stones not very regularly laid. Beyond, and north-eastward of the arch are some remains, which are supposed to be those of the equestrian statue of Marcus Aurelius, now in the Piazza del Campidoglio, certainly one of the finest, if not the very finest, equestrian statues in the world. At the western corner of the arch in front of the Temple of Concord is the nucleus of a tall, circular structure about 15ft. in diameter, supposed to be the Umbelicus Romæ. Commencing from the Umbelicus Romæ is a platform on a level, or nearly so, with the ground next the Capitol, with a perpendicular face about 10ft. high, forming part of a circle towards the forum which is cased with marble, and on which there are several projections and the remains of copper cramps, to which some antiquarians, and amongst others Canina, considered the rostra of vessels were affixed. Part of this monument is still covered by the modern

road carried on a higher level by arches, and which here traverses the forum in a south-westerly direction. Returning to the wall of the Tabularium we find separated from the Temple of Concord by a passage of about 5ft. in width, the remains of a temple, three of whose Corinthian columns still support the north-west corner of the entablature of the portico inscribed with the letters, Eshom. This temple which, like all the others in the Forum, stands on an elevated podium faced towards the Forum, and concealed a portion of the loggia of the Tabularium. Before its southern corner on the other side of the road which passes in front of it, is the nearly perfect Ionic hexastyle portico of another temple, having its façade at right angles to that of the temple last mentioned; upon the entablature of the Ionic portico may still be read the complete inscription, Senatus populusque Romanus incendio consumptum restituit. Under the cella of the temple are considerable remains of vaulted chambers; in front is a ruined terrace where the steps of the temple must have been, round which the Clivus Capitolinus was carried at a steep incline, continuing its upward course along the north-western side of the temple. The two last described temples are beyond dispute those of Vespasian and Saturn. Antiquarians have differed very much as to their identity, but modern opinion has generally agreed with Canina in ascribing the Ionic temple to Saturn. For the conclusion there seems to be full and sufficient reason, and assuming it therefore to be correct, it necessarily follows that the other Corinthian Temple, and formerly called the Temple of Jupiter Tonans, was that dedicated to Vespasian; it was probably built in the time of Titus and appears to have been restored by the Emperor Severus; in the hall of the Tabularium behind this temple is a doorway which was built up in ancient times and further concealed by the construction of the temple. It gave access to a staircase which is still preserved, and led to the upper floors of the Tabularium without any communication with the lower story. The age of the Temple of Saturn was a much disputed question with the Roman antiquarians; Macrobius says it was dedicated by King Tullus Hostilius, while Varro asserted it was begun by Tarquinius Superbus and dedicated by Titus Lartius the first Dictator, B.C. 501; Dionysius attributes it to the Consuls of the year B.C. 497; Gellius attributes it to L. Furius, Military Tribune, B.C. 381; but all agree in carrying back its original construction to a remote date. The temple was rebuilt in the time of Augustus by Munatius Plaucus, and though the existing portico is evidently a late and clumsy restoration, it would appear that the character of the building in the time of Trajan was as we see it now. The Temple of Saturn was the Treasury of the Roman government, and the military standards were kept here. It was into this temple that Julius Caesar made a violent entry for the purpose of taking possession of the treasure of the State. Between the Temple of Saturn and the Tabularium is a terrace at a level considerably above the Forum, having at the back a long portico or colonnade built in part against the Tabularium and in part against the retaining wall of the Clivus Capitolinus, which is here above it; behind the colonnade in a series of small cells. The colonnade has been much restored, I believe by Canina, and by the restored inscription on its entablature it appears that this colonnade once contained images of the 12 dio consentes placed here by Vettius a Praetextatus, prefect of the city, A.D. 367; but this in all probability is a restoration of a much earlier shrine, containing, as mentioned by Varro, 12 gilded images, 6 of the gods and 6 of the goddesses. At the level of the road below and approached by a narrow passage on the south-west side of the Temple of Vespasian are a series of cells or chambers; they are supposed to have been waiting rooms or offices for notaries or the clerks or criers of the Ediles—they are called Schola Xantha, a name first found in the apocryphal account of the regions of Rome which passes under the name of Sextus Rufus. The lane running between the Temple of Saturn and the Basilica Julia was the Vicus Jugurarius running from the base of the Tarpeian Rock to the Forum.

(To be continued.)

The Ashbourne Local Board have raised the salary of Mr. Burton, surveyor, from £80 to £75 per year.

* A paper by EDWARD T. ANSON, F.G.S., F.R.I.B.A., read before the Royal Institute of British Architects, June 9, 1879.

OLD CARPENTERS' HALL.

THOSE interested in the few remaining relics of Old London will be concerned to hear that the Old Carpenters' Hall in London Wall is in progress of demolition, and that the remnant of the old frescoes which adorned the walls, besides a beautifully enriched plaster ceiling, are now in the hands of the workmen. The Carpenters' Company is one of the most ancient of the City trade guilds, having been founded in 1428 by Roger Jordan. The Hall was originally built in that year, but we find that the present apartment known as the old hall is certainly of later date in its decorations. Upon one of the shields in the panels of the ceiling the date 1671 occurs, and, from what we can gather, the hall underwent considerable repairs and decorations in 1561, and also in 1664 and '65. It appears to have escaped the great fire of London, which swept away the Drapers' Hall adjoining, and for three years its hospitable company sheltered other guilds within its walls, and it became the Mansion House for the time being. The old hall was oblong in shape, and extended some distance across the new roadway now called Throgmorton-avenue, which has cut off a considerable wing of the original building. The present remains of its splendid plaster ceiling embraces two compartments of panels, one being circular and the other octagonal in shape, divided by richly decorated beams of plaster, with a guilloché on their soffits. Each panel has a deeply moulded and enriched border composed of leaves; the centres are decorated with shields, one bearing the engrailed chevron and three pairs of compasses, the arms of the company; and the other has the name of a master, with the date 1671 upon it. These shields are each surrounded with a triangular scroll work of foliage, with figures of angels at sides modelled in high relief. Boldness and vigour characterise the work. On the sides are margin panels of plainer design, and the compartments are marked by cross beams with circular springings resting upon panelled pilasters in the walls. We observe that the latter are of plaster and encase timber posts, and only the upper portions now remain. Though these plaster decorations are begrimed with dust and dirt, they are yet wonderfully perfect in the upper portions: the mouldings to the pilasters are sharp, and it will be unfortunate if no effort is made to save them from their inevitable doom. The frescoes we have referred to form a long panel, about 1 ft. high, along one side of the hall, and are in three divisions. One represents, apparently, the building of the ark, a carpenter sawing timber, and another King Josiah and workmen repairing the temple. The drawing and colours are discernible, and red and yellow in the draperies and timber are still bright. These wall paintings were first discovered in the year 1845 by some workmen engaged in the hall, and, according to Jupp's "Historical Account," were painted as early as 1570. In that work engravings are given of them. We have no doubt a series at one time surrounded the hall, as the remaining frescoes are just head high, and it is likely that the rough wooden gallery erected round the apartment was the cause of their destruction. As an early example of wall painting in a tolerable state of preservation, we hope every effort will be made to save the frescoes. We understand upon inquiry that the company have been endeavouring to get some antiquarian society to take them at the cost of their removal. The funds of the company are said to be insufficient to be devoted to the preservation of these relics, although we heard it was the intention of the company's architect, Mr. Pocock, to reproduce the ceiling of the old hall in the new building now nearly completed. Ascending the staircase into the wing at the rear, we enter the court-room, which dates about 1664, a long apartment with a richly panelled ceiling, though of less interest than the one below. There is, however, a grand old chimney-piece of oak, with overmantel, composed of side pilasters and ramps. The jamb pilasters are enriched with carved foliage in the panels, and the frieze or mantel is adorned with well carved festoons. The old doorways have pediments, and some capital portraits of masters and wardens are on the walls—one a portrait of W. Partington, Esq., one of the earliest masters of the company. But the vestibule is unique in its way. It was erected in 1780, by W. Jupp, the company's surveyor, the wall decorations being in the style of the Brothers Adam. It is square in plan, with a

domical ceiling. The walls are panelled, and each side is adorned with an emblematic figure in plaster relief in an oval medallion, surrounded by the elegant festoons and enrichments of the period. Over these, in the frieze panels, occur relieve heads of Vitruvius, Palladio, Inigo Jones, Sir C. Wren, with side panels decorated with bas-reliefs of carpenter's tools in groups, all very tastefully executed. The walls are painted of two shades of light-bluish green, relieved by gold. Externally, the building which remains is chiefly of wood, and an interesting example of 16th century architecture, reminding us of Inigo Jones' work. The entrance front facing London Wall is evidently only half the extent of the original facade, as the pedimented centre is now on the avenue side. It is of two orders, rusticated and relieved with pilasters and some good detail. The court-room front is low, and has also a pediment with pilasters upon a basement, and no doubt was originally a conspicuous facade crowned by a handsome cornice. The books of the company show an entry that Sir C. Wren received an invitation to dinner, together with his wife. Besides the architectural remains we have pointed out are some fine panels of oak carving, charged with armorial devices; a massive state chair, richly carved; and an octagonal table of oak, having the date 1606 upon it.

WOOD-WORKING MACHINERY.

WE have recently had brought under our notice a new mortising machine, invented by a Mr. Phillips, brought out under the auspices of Messrs. F. W. Reynolds and Co., the wood-working machinists, of 73, Southwark-street, London, and patented both at home and abroad. Two patents cover the machine: the one affecting the oscillating lever-fulcrum, which brings the first condensation of power on to the extremity of the tools used in mortising, boring, core-driving, and tenoning; but the more important patent is the tool-holder, of which the following description will give a very practical idea of its utility as a *time-saver*, as it will be apparent that no resetting of the wood for core-driving, and no repeated change of tools in the spindle are required, the multiple-action tool-holder itself being always ready for instantaneous adjustment.

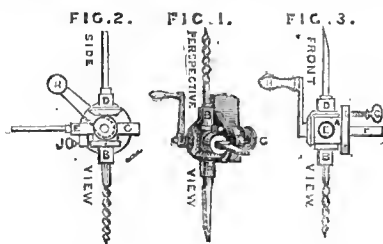


Fig. 1 is a perspective view of the tool-holder. Figs. 2 and 3 are mechanical drawings of the same, and refer to the following description—Fig. 2 being a side view, and Fig. 3 a front view:—Imagine the tool-box A (Fig. 3) is the nave of a wheel with four arms, B, C, D, and E, all capable of being turned round on the axle F (Fig. 3), and held in desired position by spring bolt G (Fig. 3). The auger is worked by means of a handle H, which handle is also used for reversing the chisel when mortising, and is held in position by the spring bolt J (Figs. 1 and 2). To cut a mortise, the wood being fixed in the ordinary manner, B is ready for boring if required, when finished take spring bolt G in right hand and turn round D, the chisel, into position, after the mortise is cut, the core-driver E is brought into position in the same manner, and the mortise is thus finished. The several tools are brought into operation with as little trouble as a joiner experiences in shifting his mallet from his right hand to his left.

THE COACHMAKERS' EXHIBITION.

ON Friday last, the Lord Mayor distributed the prizes awarded in connection with the exhibition recently held in the Mansion House under the auspices of the Coachmakers' and Coach-harnessmakers' Company. The Committee of Judges reported that there were 30 competitors in all, with 68 drawings, of which 46 were freehand or mechanical drawings and 22

carriage drawings. The former were much more numerous than on any previous occasion, and they attained a higher average standard of excellence. The special prizes offered for competition among apprentices and young men under 22 years of age were now attracting more notice than formerly, and the work sent in was in several cases very satisfactory. The new art and technical school held in St. Mark's School was doing good work, and, being brought into competition with art classes in the provincial cities and towns, was causing a little wholesome rivalry. The competition in the division of carriage drawings was not so satisfactory. Mr. J. P. Lake, of Howick-place, won the highest prize with two sets of working drawings, showing the construction of every part of a four-horse drag and a dress chariot. The majority of the carriage drawings were by no means satisfactory, and the committee in consequence had withheld the second prize. The principal winners were Mr. William Farr, coach-trimmer, of Salisbury; Mr. George Mundy, of Grantham, coach-body-maker; William Thomas Easton, of Portsmouth; apprentice; Herbert Mulliner, of Leamington, clerk; and Walter Coward, a lad of 15 or 16, who took four or five prizes. Mr. Frederick Chancellor, the Master of the Company, took occasion to tender the thanks of the guild to the Lord Mayor for allowing the exhibition to be held in the Mansion-house, and spoke of the interesting nature of the exhibits. The Lord Mayor said the Coachmakers' Company were showing a good example to the other guilds of the City in thus practically promoting technical education in the particular trade with which they were connected. For himself, he differed from those who thought that such education was best promoted by the rich Companies clubbing together and starting a college. On the contrary, he advised each Company to devote itself to the furthering, according to its means, of the special trade with which it was associated, and he believed that if the guilds did so there would be a great stimulus given to trade in all directions.

NATIONAL WATER SUPPLY.*

By J. BAILEY DENTON.

I VENTURE to express the opinion that, at the present juncture, the only way of bringing to a practical bearing the knowledge in possession of the country, and the evidence given before the several Royal Commissions and Parliamentary Committees on the subject of our water economy in its various phases, is to impress upon the Government and the Legislature that the obligation to provide potable water of unexceptional purity for towns and villages situate within river basins, ought to precede all other considerations in relation to the improvement of rivers and watercourses, and that any action taken for their conservancy must fail in this one all-important point if it does not proceed upon such recognition. It will be observed that in the Bill now before the House of Lords no direct reference is made to water supply, although such is the reciprocal bearing of that object upon river conservancy, that it is hardly possible to deal with one in a comprehensive way, independently of the other, without some prejudicial effect.

The timely proposition of the Prince of Wales that there should be a central permanent commission, whose duty it would be to investigate and collect facts connected with water supply in the various districts into which the United Kingdom may be divided, "in order to facilitate the utilisation of the natural sources for the benefit of the country as a whole," must, I submit, commend itself to every one as supplying, in the most tangible form, the omission of the Rivers Conservancy Bill, to which I have just referred. The suggestion is the more apposite, as it comes at a time when the larger centres of population are not only providing themselves with water to the disadvantage of small towns and villages, but are rendering unfit for domestic use—by pollution—the waters they do not appropriate.

It is an incontrovertible fact that, inasmuch as all rivers are maintained by the outflow of springs, issuing from the water-bearing strata, and by the natural conservation of the rainfall upon high uncultivated surfaces, it is not possible to raise water from subterranean sources,

* Contributed to the recent National Water Supply and Sewage Conference of the Society of Arts.

or to intercept water from high grounds for the supply of populations, without affecting the flow of rivers and watercourses, while it is equally certain that any acts of conservancy which may lead to the more rapid discharge of watercourses descending from the hills to the valleys, will prejudicially affect the local water supply of the districts through which these watercourses pass. At the same time, it is known to those who have carefully studied the earth's stratification, that such is the alternation of pervious and impervious strata throughout this country, that there hardly exists a river basin wherein, by special works of combination or otherwise, towns and villages may not be economically served with water without any appreciable effect upon our river systems.

What is now wanted is the record, in an intelligible form, of such hydrogeological information as is already in the hands of the Geological Survey Department, to be supplemented from time to time with additional details. This would furnish the most useful data in the hands of any Commission which may, on the suggestion of H.R.H. the Prince of Wales, be formed, and would make every one familiar with the underground sources of supply.

A GRAMMAR OF JAPANESE ORNAMENT.*

WE have lately noticed several works of a decorative character, and not a few upon Japanese ornaments, and we have now another upon our table bearing the above title. By a grammar we naturally understand a work treating of fundamental principles, or, at least, a collection of examples that shall indicate the formation of a style of ornament. Mr. Thomas W. Cutler's work, the first part of which is before us, is a collection of examples of a somewhat mixed and disursive character, and in the absence of the barest descriptive letter-press, we can hardly understand the claim it has to be called a grammar. But we take it as the first instalment. The plates are not numbered in consecutive order, but contain a selection from a comparatively large number, and, from what we can see of the first part of the work, it promises to be one of real artistic merit. The first plate represents some picturesque groupings of the crane, a bird held in veneration by the Japanese, and accepted as the emblem of longevity. We find the group No. 2 is a reproduction from an old Japanese work in our possession; it has been very faithfully copied by the artist, even to the shading of the birds, though the darkly-shaded parts in the original are not so black, and there is a half-tint that lessens the sharpness of the shadows against the lighted plumage. The black shadows are a little too harsh. It is well known that the Japanese artist is particularly skilful in the representation of birds, either by themselves, or combined with vegetable forms; they are grouped in every conceivable manner, and every posture and action is watched with a keen artistic appreciation. Besides the crane, the wild duck, the peacock, pheasant, and the common fowl, and smaller birds supply an exhaustless variety to the artist. Messrs. Audsley, in their magnificent work "Keramic Art of Japan," allude at length to the treatment of birds, and one of the most favourite modes of representing them is that in a group or resting, as in the examples given by Mr. Cutler. Plate 2 shows another example of a bird upon a branch, well adapted for screens, wall decorations, &c. Plates 3 and 4 illustrate other varieties of the feathered tribe, either at rest or on the wing, and a conventionalised study of them. Mr. Cutler has carefully assorted the elements in each kind of representation; he has shown the idea of height and cloud by the introduction of the favourite sprigs of fir, bamboo or "mume," and the conventional cloud in some cases. In foliage and flowers we find a few choice and suggestive examples, several plates being devoted to vegetable forms. The *kiku*, or chrysanthemum, the wisteria, the *butan* or peony, the iris, the *kiri*, the *mume*, the fir and other forms are found. The fir is of as frequent occurrence in lacquer and bronzes as the chrysanthemum. Plate 50 shows a striking treatment printed upon a brown ground, suitable for wall papers and textile fabrics, and the sprays of foliage on plate

38 are thoroughly characteristic of the Japanese spirit and scheme of decoration. We note a variety in the printing of the illustrations, and for artistic reasons we prefer those printed in a light shade of brown or grey, to those in black. The birds on Plate 3 would have been infinitely more pleasing in the light tone adopted in Plate 4; the harsh black shaded portions in figures 5 and 6 are destructive to the feeling of the Japanese work as displayed in native illustrated books. Plate 14 is the least pleasing in the number before us, and 49 has little Japanese *motif* about it. Remarkably quaint is the conceit shown depicted on Plate 13; it is thoroughly Japanese in idea at least, and we hardly know which to admire the most, the grotesque combination of the fish and the stream, or the humorous mode of conventional delineation. Mr. Cutler's work is bound in a wrapper, thoroughly expressive of the style, if we cannot say the design is imbued also with its sentiment. For the first part of a grammar of ornament, a little more of the intention of the author and the scope of the work might be expected; as the work proceeds there will be an opportunity for development, and we may fairly expect even better and more suggestive examples to follow. It is because of its purely suggestive character that the style of Japan is useful to the decorative artist; to copy it unmeaningly in our papers, china, and textiles would be to bring it into deserved ridicule, and to hasten its rejection by all artists worthy of the name. It is admirably suited for decorative work or simple flat surface ornamentation; and a grammar that will afford insight into the mode of designing of the Japanese artist, and give illustrations of conventional forms rather than studied grotesques, will be of considerable value.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—The closing meeting of session 1878-9 was held on Monday evening. Votes of thanks were passed to the retiring officers for their past services. The following were elected as officers for the ensuing session:—President: Mr. William Hale. Committee: Messrs. R. B. Morgan (chairman), A. Freeman Smith (treasurer), Fred. G. Hughes (hon. secretary and librarian), F. W. Cross, O. Essex, W. H. Kendrick, H. H. McConnal, J. P. Osborne, A. Reading, and E. Wood. Messrs. W. G. Mantle and T. Jones were appointed auditors.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The twelfth meeting of the Session was held last Wednesday, Mr. Syer Cuning, F.S.A. Scot., in the chair. It was announced that Lord Waverley had been elected President for the year, and that the Congress had been fixed to commence on the 11th of August, at Great Yarmouth, ending at Norwich on the 20th. A large number of antiquities were exhibited, including some interesting Roman remains from Southwark by Mr. Way, a gilt crucifix discovered in the City by the Rev. S. M. Mayhew, and a perfect Norman jug from Cheapside by Mr. Loftus Brock, F.S.A. It was ornamented by bold diagonal lines and flowers laid on in slip. The first paper was by the chairman, who described one of the figures on a richly-embroidered chasuble of the close of the fifteenth century, found in 1825 in a walled-up crypt beneath Warrington Church. The figure represented St. Thomas, Earl of Lancaster, beheaded at Pontefract, 1322, after being taken prisoner by the Royalists. He is represented in armour of the period, and with a battle-axe. In the northern counties he was considered to be a martyr to the public cause, and was called a saint. Pilgrimages were made to the hill on which he suffered, and a particular office of Mass was drawn up for the celebration of his festival. The second paper was by Mr. C. H. Compton, and descriptive of the Company of Horners of the City of London, a company which, instead of being extinct as has been said on high authority, is still extant. The antiquity of the craft was referred to, and it was shown that Horners were classed among the eight mysteries of the City, temp. Edward III., but the company was not incorporated until 1641. It ceased to be a trading company between the years 1745 and 1796. It never possessed a hall, although it is authorised to build one. The livery is limited to 60, but between 1808 and 1833 only 14 members had been admitted. Some

deeds of the time of Elizabeth and articles of horn were exhibited. The concluding paper was by Mr. J. T. Irvine, who described the results of a journey made along the course of the Wansdyke from Bishops Canning in the direction of Bath. The earthworks are in places remarkably perfect, showing a high bank with a deep narrow ditch, so narrow in fact as to disprove the theory that it could ever have been used in part of its course for the main Roman road to Bath.

LEEDS ARCHITECTURAL ASSOCIATION.—At a meeting of this association on Thursday week a paper, entitled "The Renaissance in England," by Mr. John J. Stevenson, F.S.A., London, was read, in the absence of the lecturer, by Mr. William H. Thorp, hon. secretary. The paper treating upon the Renaissance of Classical architecture in England is one of the chapters of a book on Domestic Architecture, of which Mr. Stevenson is the author. In the commencement of the paper the lecturer stated that "the new architecture, in anything approaching the purity of the Italian style, took root in England, as the accepted style for ordinary buildings, later than in any of the countries that had already been spoken of, namely, Italy, France, Holland, and Belgium." The English are a conservative people. The native style was strong and vigorous, sensible, suited to domestic wants.

COMPETITIONS.

GLOUCESTER.—The designs for the new Gloucestershire pauper lunatic asylum, proposed to be erected on the Barnwood Mill Estate, have been sent in to the office of the Clerk of the Peace for the County at Gloucester. About thirty architects have taken part in the competition, and the drawings are at present arranged in the Shire-hall for inspection by the Visiting Justices of the asylum, with whom rests the selection. The premiums offered are, first £150 and second £70. It is intended only to erect at first the administrative block and such portions of the buildings as may be immediately needed for patients, but the designs are to show for the completed scheme.

IPSWICH POST-OFFICE.—We understand that the report of the referee (Mr. C. Barry), to whom the designs for the Ipswich Post-office have been referred, will shortly be made public. The design of "Well Considered," which from the first was a favourite with the Committee, is we believe the one recommended in Mr. Barry's report. Our review of the competition designs spoke of this one as the most expensively treated externally, and now we hear the element of cost has been sunk altogether, as Mr. Barry finds what we before said, that the sum of £6,000 is insufficient for the purpose. We presume, therefore, the merits of the designs alone have been taken into consideration in making the award; but this opens a new question, in which all the competitors may have a word to say. One of the strongest points which has gone in favour of "Well Considered" is, we understand, the manner in which the drop in the level of the public office portion has been managed. The author has wisely pronounced this part of his elevation by a pediment. In the new Library and Museum Competition, noticed elsewhere this week, we recognise the same hand in the design marked "Simplicity."

KINGSTON-UPON-HULL.—BOROUGH LUNATIC ASYLUM.—The Committee inform us that the time for sending in plans for the above asylum has been extended to the 21st of July.

At the suggestion of Mr. Ewan Christian, under whose supervision the collegiate church of St. Peter, at Coggeshall, North Essex, was restored, the memorial to the late Vicar of Coggeshall will take the form of a carved oak chancel screen, with light mullions, open arches, a rich cresting above, and panelling below.

Christ Church, Preston, is about to be restored from the plans of Mr. Joseph Harding, of that town. It is proposed to re-shape and lower the pews, to build an organ chamber on one side the chancel and a choir and minister's vestry on the other, and to remove part of the side galleries.

The Wimborne highway board have elected Mr. Robert Seymour, of Little Canford, as surveyor at a salary of £180 a year. There were over 70 candidates for the appointment.

* A Grammar of Japanese Ornament and Design. By THOMAS W. CUTLER. London: B. T. Batsford.

Building Intelligence.

BAXENDEN, NEAR ACCRINGTON.—The corner-stone of St. John's Schools was laid on Saturday last by Mrs. H. W. Worsley, of Chislehurst. The building will be built of stone, and comprises a large room for boys and girls, two classrooms, and book closets; adjoining the west side of school is a master's house, containing sitting-room, kitchen, scullery, and bed-rooms over the same. The schools will have accommodation for 400 scholars, and will cost about £3,500. The style of architecture is Gothic of a simple character. The works are being carried out by local tradesmen from designs prepared by Mr. William S. Varley, architect, Blackburn.

BRISTOL.—The old church of St. Thomas, Bristol, has undergone an extensive restoration. The new works include the substitution of new open benches of oak for the old high pews, and the heating of the building by hot water. One bay of the old nave has been arranged as a chancel, enclosed by carved open screens of oak, walnut, and sycamore. The chancel has been fitted up with carved choir seats and a new altar. A new font of stone and marble has been provided. The whole of the floor not occupied by seats is laid with Maw's tiles. The altar piece, erected in 1716, and the choir gallery, in 1728, have been cleaned from various coats of black varnish. The walls and ceilings of the entire church have been effectively decorated in oil colours; on the walls of the chancel are painted the figures of St. Augustine of Canterbury, Thomas à Becket, John Wicliffe, and Bishop Butler, being all of them connected with the history either of the church or neighbourhood. The architect under whose superintendence the works have been carried out is Mr. W. V. Gough, of Nicholas-street, Bristol. The total cost of the entire work is £3,500.

CHESTER.—On Tuesday week the memorial stones of a new Baptist chapel at Chester were laid. The building will consist of a chapel 43ft. wide by 56ft. long inside, with porches at each side to the front and vestries at the back. There will be a schoolroom underneath, the same size as the chapel above. The materials used for the outside are red Ruabon bricks for the walling; the dressings for doors, windows, strings, &c., of stone from the Cefn quarries, and the roofs are to be covered with brown tiles. The interior of the chapel is intended to be finished with buff brick. The contract has been let to Mr. D. Sheen, and the building has been designed and will be carried out under the superintendence of Mr. John Douglas, of Chester.

EDINBURGH.—The erection of the spire of St. Mary's Cathedral, Edinburgh, was formally completed on Friday afternoon by the adjustment of the cope-stone. Springing from the tower of the cathedral, which itself is 112ft. high, the spire, a stone structure of octagonal form, is carried up till the height of 275ft. is attained, and above the cope-stone there is to be placed an iron cross 15ft. high. In the junction of tower and spire a somewhat unusual arrangement has been followed, the tower being changed from the square to the octagonal form at the bottom of the belfry, a stage lower than that at which the spire proper commences. At the point where the change of form is effected, stone pinnacles each 50ft. in height and about 9ft. 6in. in diameter, are reared over the four corners of the tower. At the base of the spire richness is given to the design by the introduction of four niches, each containing a sculptured archangel, 9ft. 6in. in height, and, alternating with these, as many Gothic windows, artistically treated with gables surmounted by crosses. Over these the stonework is carried up in the ordinary way, till it terminates in a large carved finial supporting the crowning iron cross. The work in this part of the cathedral has occupied eight months, but, of course, had the winter been less severe, it would have been completed some time ago. The scaffolding is itself a work of some interest. It is constructed of Norway fir specially imported for the purpose, and, while remarkably light, in comparison with the cumbersome erections often seen round similar buildings, is at the same time perfectly secure.

FALKIRK.—Last week the memorial stones of a new Masonic-hall and new Town-hall were laid at Falkirk. The Masonic-hall joins the east wing of the Town-hall, and the front elevation is in

harmony with its style of architecture. The Town-hall is in the Italian style, and measures in the interior 87ft. by 44ft. The upper part of the hall measures 94ft. by 65ft. The ceiling is divided in panels, with ornamental centre flower, and the roof supported on cast-iron columns. The hall is seated for upwards of 1,600. The cost is over £4,000. Messrs. A. and W. Black, Falkirk, are the architects.

GATESHEAD.—The foundation-stone of new day industrial schools was laid on the 5th inst. The new buildings are designed to accommodate 100 boys and 100 girls, and are two stories high. Red bricks is the material employed, with stone dressing, and slated roof. The entrances, staircases, and corridors will be fireproof, and various portions used by the children will be heated by hot water. The general contract for both schools has been let to Mr. Alexander Thompson, of Gateshead. The buildings have been designed by Messrs. Oliver and Leeson, architects of Newcastle-on-Tyne.

GREAT HARWOOD.—New Congregational Sunday and day-schools were opened in this place on Saturday. The schools have been erected from the designs of Mr. W. S. Varley, of Blackburn, and seat 700 children, under the Government regulations, although at public meetings nearly 1,000 persons can be accommodated. They consist of a schoolroom 73ft. by 35ft.; infants' room, 52ft. 6in. by 35ft.; and babies' room, 30ft. by 15ft.; five class-rooms, each 15ft. by 14ft. The rooms are each 13ft. high in the square, and 22ft. 6in. to ceiling. Porches fitted as hat and cloak-rooms are provided in each school, and beneath the infants' room are heating vault and coal-store. The walls are of pointed rubble, and the dressings are of ashlar from local quarries. A dado of polished pitch pine is carried round each room to height of window sills. The roofs are of varnished pitch pine, ceiled at the collar beam, and covered with blue Velineli slates. The windows are glazed with fluted-rolled plate-glass, having iron ventilators sashed in same. The warming is by hot water on the low-pressure system. The chief contractors are—masons, Messrs. Maden and Butterfield, Accrington; joiner, Mr. Daniel Birtwistle, Great Harwood; slater, Mr. Thornley, Church; plumbers, glaziers, painters, gasfitters, and hot-water engineers, Messrs. Harley and Hartley, of Great Harwood. The total cost, inclusive of boundary walls, formation of play-yards, galleries, &c., has been about £2,000.

LYNN.—The Corn Exchange at Lynn has been considerably improved so far as the roof is concerned, which has been constructed and glazed on Rendle's new principle, entirely dispensing with the use of putty or any other cement. The length of the roof (which is constructed of iron) is 170ft., by about 28ft. wide on either side, and contains an area of nearly 9,000ft. superficial of the patent glazing. The increase of light is nearly 50 per cent. over the old method, and the appearance is vastly improved by the removal of the heavy sash bars for the small vertical tubes which are used in this system. There is a lantern on the summit of the roof, which affords ventilation to the building by means of "louvre" boards. The whole work has been carried out by Mr. W. E. Rendle, of 3, Westminster Chambers, London, who is the patentee of the system. His patent is now used by most of the railway companies, Her Majesty's Government and the leading architects and engineers. He has already supplied two million square feet of his patent glazing; and one station (the Carlisle citadel) which will shortly be commenced, will cover seven acres, and contain an area of 350,000ft. super.

NEW ROMNEY.—A public meeting was held at New Romney, Kent, on Wednesday week, for the purpose of considering the question of restoring the parish church. Mr. G. Gilbert Scott, F.S.A., read a report prepared by his late father, setting forth the architectural history of the building, and the reparation he deemed necessary. The amount required for the entire restoration of the fabric, exclusive of fittings, was estimated at from £3,500 to £1,000, but the work, it was suggested, might be divided into sections. A resolution appointing Mr. G. G. Scott architect for carrying out the plans of the late Sir Gilbert Scott was carried unanimously, as was another appointing a local committee.

TORQUAY.—A new Wesleyan chapel at Torquay was opened on Thursday week. The style adopted

is Classic, freely treated. The chapel on the ground-floor is 79ft. by 50ft. Accommodation is provided for about 1,000 persons. A school-building is erected on the higher side of the chapel. The buildings have been very creditably carried out by the contractor, Mr. E. P. Bovey, of Torquay, the carving being executed by Mr. H. Heus, of Exeter. The architects were Messrs. J. Rowell and Son, of Newton and Torquay, Mr. E. Richards, their assistant, having attended to the carrying out of the details generally. The cost of the building has been about £6,000.

WIGAN.—The foundation-stone of the new church of St. Andrew, Wigan, was laid last week. The new edifice, the general character of the architecture of which will be Early English, is designed to accommodate 580 persons. The church will comprise a nave 26ft. 6in. wide, and 70ft. long, with aisles on each side 10ft. wide; a chancel 27ft. 6in. wide, and 34ft. long. The chancel will be the same height as the nave, and separated from it by a screen, and a double principal in the roof. On the north side of the chancel there will be a large aisle, and on the south side the organ chamber and vestries for the choir and clergy. The interior of the church will be upwards of 55ft. in height to the apex of the roof. The general entrances will be to the west of each of the aisles, while a separate entrance will be provided for the vestries. At the north-west angle of the nave the bell-tower will be situated. The church is to be built entirely of brick with the exception of some small portion of the windows and the pillars for the arches. The interior will be finished with red pressed bricks relieved by moulded bricks and dark brick bands. Mr. F. W. Hunt, of London, is the architect. Mr. W. Winnard, of Wigan, has been entrusted with the contract. Mr. Varty is clerk of the works.

YORK.—The foundation-stone of a new Primitive Methodist Chapel was laid on Whit-Monday at York. Mr. Wm. Peachey, of Concy-street, York, is the architect of the new edifice, which will seat 900 persons. The style is Renaissance, carried out entirely with red and white pressed bricks, with a little terra-cotta. The ground-floor is seated in amphitheatre form, all the seats curving from the point at which the minister stands upon the rostrum. There will be a gallery upon the four sides, that behind the rostrum being appropriated for the organ and choir. The interior height is 38ft. to the centre of the ceiling, which consists of three curves relieved by moulded and enriched plaster beams springing from a moulded cornice. Four vestries, with the usual conveniences, are provided below the organ gallery, &c. The total cost will be about £3,000.

CHIPS.

A group of children's houses have just been built for Miss Cotton, in Davis-lane, Leytonstone, from the designs of Mr. Streatfield. They are arranged as a quadrangle, built in on all four sides, and are in three floors. Mr. Parminster, of Braintree, was the builder.

The Royal Hotel, Great Yarmouth, has just been enlarged from the designs of Mr. Pearce, of Norwich. The additions consist of a billiard-room, 36ft. by 28ft., fitted in mahogany, with coved and panelled ceiling, and arranged for two tables; a ladies' drawing-room, and above the latter two floors of seven bedrooms each. Mr. Edmund Howes was the builder, Mr. Harrison the mason, and Mr. Cooper the carpenter.

The formal opening of the restored church of Stratford St. Mary, Suffolk, took place on Thursday week. The east end of chancel has been rebuilt, and the chancel floor raised; a roaredos has been erected, having an arcade of open tabernacle work and a super-altar of polished Devonshire marble; new handsome carved oak screens and sedilia altar-table, pulpit, and lectern have also been placed in the chancel, and the whole church has been paved with Minton's tiles. The south aisle has been rebuilt, the clerestory renewed, and parapets corresponding with that on the north aisle added to the whole church; the roofs repaired and reconstructed, and Porritt's warming apparatus has been introduced. The work has been executed under the direction of Mr. Woodyer, of Guildford.

The church at Kemerton, near Tewkesbury, was rebuilt in 1847, with the exception of the tower, the lower part of which dated from the 11th century. This has just been restored from the designs of Mr. W. White, F.S.A., the work being carried out by Mr. Collins, of Tewkesbury, except the re-hanging of the bells, undertaken by Messrs. Mears. The reopening services took place last week.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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RECEIVED.—J. E. and Co.—H. and Co.—W. P.—J. M.—C. E. M.—T. P. B. and Sons.—W. T. S.—R. J. A.—J. B.—A. S. and S.—J. D.—W. of E. G. Co.—J. A. Y. and Co.—J. T.—T. L. B.

"BUILDING NEWS" DESIGNING CLUB.

Press of matter obliges us to postpone our review till next week.

DRAWINGS RECEIVED.—Several other drawings have come to hand since the publication of our list last week.

AN INTENDING COMPETITOR. (The wash and bakehouse may either form a distinct building for the row or be attached to each cottage. The former was intended.)—MAURICE DEACON. (Get Mr. Baldwin Latham's "Sanitary Engineering," published by E. and F. N. Spon, 48, Charing-cross.)

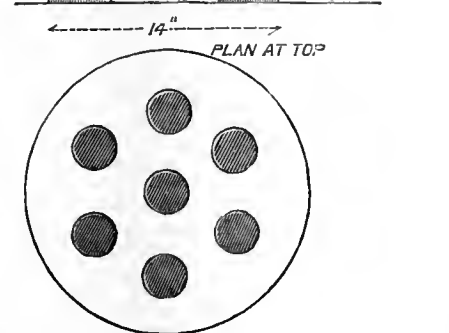
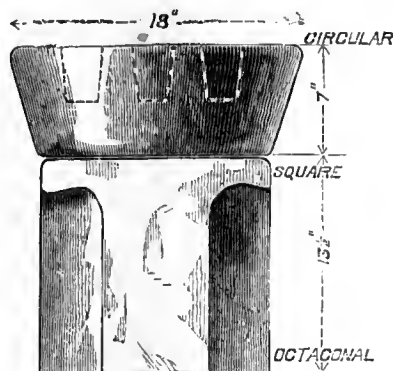
Correspondence.

A SINGULAR STOUP.

To the Editor of the BUILDING NEWS.

SIR—The out-of-the-way parish church of Lewanick stands upon a hill in a remote part of Cornwall, full six miles from the nearest railway station. It is situated in the immediate neighbourhood of the Polliprant Quarries, and of that stone the church, in the main, is built. Mostly of a Perpendicular type—how few Cornish churches there are that belong to any other style!—its pinnacled tower is of noble proportions, and, although essentially a West-Country building, there is much that is otherwise of decided interest pertaining to the edifice. Upon the splay of the stone seat in one of porches a hare hunted by hounds is vigorously carved, and a large Norman font, octagonal, and just 3ft. over, stands, in a capital state of preservation, at the west end. The bench ends are all old and boldly carved on face and on mould, those at the angles of the aisles and central avenue, east and west, having further carved terminations, each consisting of winged angels kneeling in attitudes of adoration. This treatment is rare, by the bye, for the West-Country bench-ends are almost invariably found to be square-headed and without standards. Indeed, poppy-heads are so seldom met with, that in the whole of Devon I only remember, for the moment, St. Mary's, Atherington, and St. Michael's, Ilminster, as affording samples of foliated terminations. Fur-

ther, the local ends are always found to be in the solid, 3in., 3½in., 4in., and even of greater thicknesses. Framed ends, such as one meets with sometimes in the Midlands, and elsewhere, have no counterparts in the extreme West. But, to my text. Near to the north-west porch at Lewanick Church, within the building, and close to the book-board end of the old seating, is a very curious stoup. Here it is:—It is of polished



granite, but of a much finer and a better sort than is that the immediate neighbourhood provides. The seven holes in the top, shown upon the plan, are each 2½in. wide and 3½in. deep. Are they symbolical of the seven churches, and do similar stoups still exist elsewhere? To me this one is unique.—I am, &c.,

HENRY HEMS.

GLOUCESTER ASYLUM COMPETITION.

SIR—I am informed that the firm of which the County Surveyor for Gloucestershire is the senior partner are competing for this work, and also that before the competition they prepared a design for the proposed asylum by the instructions of the magistrates. Now, I venture to think, that this is doubly unfair. In the first place, I do not think it is right that the salaried officer of any public body should be allowed to compete in a matter where such public body are the judges; and secondly, I think it is unjust that professional men who have been consulted prior to a competition should afterwards be allowed to compete.

On both grounds there will be an uncomfortable suspicion that if even these gentlemen should succeed in keeping their motto secret, they will, from their official position, and from their previous engagement on the undertaking, have unfair advantages over other competitors, and I therefore hope that the magistrates will at once remunerate them for their services, previous to the competition, and eliminate their design from those now sent in.—I am, &c.,

A COMPETITOR WHO ONLY WANTS FAIR PLAY.

A GOOD EXAMPLE.

SIR,—I had much pleasure in reading the remarks you published in last week's issue. I with a number of working men passed some hours in Messrs. Wright and Mansfield's spacious show rooms examining their splendid work.

Will you please give me a space to make known the generous act of a firm of employers of labour to open their show rooms two evenings until ten o'clock for their own and other workmen to inspect their furniture and decoration? This unselfish act gave great satisfaction, and many hundreds of workmen availed themselves of the opportunity, and no doubt profited by the exhibition. I assure you, Sir, if employers could have seen the interest taken, and heard the remarks made they

would be convinced of the pleasure it would give us if such a useful example were followed by other firms.—I am, &c.,

F. FOWLER.

8, Windmill-street, Tottenham Court-road.

Intercommunication.

QUESTIONS.

[5794.]—**Timber.**—Can any of your readers inform me of the name and publisher of any book which gives the most thorough description and use of all English and foreign timber?—READER.

[5795.]—**Portland Stone in Temple Buildings.**—In looking at those buildings a few days since I was much struck by the smudgy appearance of the joints, which I can only compare to the sloping in of brickwork when prepared to stain for bastard tuck pointing. Upon inquiry two reasons have been assigned, neither satisfactory. 1st. It is said it is the work of the foreign masons during the late strike, and 2nd, that the work was fixed over hundred—i.e., no outside scaffold. Neither of these seem to me satisfactory, and I should be glad of an explanation; for the difference between this building and the neighbouring library is so marked that one would like to know why.—NOVICE.

[5796.]—**Tenants.**—Will some reader kindly explain the meaning of "tenant by elegit," "statute merchant staple," "in fee simple," and "in-tail" also? What is the meaning of a "continuing" Covenant?—L. T. W.

[5797.]—**Baths.**—Can any reader inform me what is the best construction for sides and bottom of a public swimming-bath (say, 100ft. by 40ft. inside) so as to make it thoroughly water-tight? Some I have seen fall as much as 2in. in the twenty-four hours.—C. W. B.

[5798.]—**Cement and Mortar Stains.**—Will any reader kindly inform me of the best method to remove cement and mortar stains off common Staffordshire tiles?—A. B. C.

[5799.]—**Architectural Examination.**—Will some reader inform me where I can obtain a copy of the questions asked in the preliminary section of the architectural examination?—S. D.

[5800.]—**Sgraffito Work.**—Could anyone give me such information as will enable me to execute a piece of sgraffito work? I wish particularly to know what kind of cement is used, what kind of colours are necessary (I should like to produce some very light tints), in what particulars the method of working differs from ordinary plastering (either for internal or external work), and if it is possible to guarantee that the colours will stand the washing of the rain, and the cement the frost.—A PLASTERER.

[5801.]—**Cellar.**—What would be the best means of proceeding to construct the lower part of a cellar, the floor of which is required to be 2ft. below the sewer in the road? Of course, I don't mean to drain it, but to prevent moisture, &c., penetrating the walls.—RIGRU.

[5802.]—**Lunatic Asylum.**—The name and situation of the most recently built lunatic asylum on the "block system" will oblige.—H.

[5803.]—**Proportion in Church Architecture.**—Will any reader name a good work on the above or give the following:—Proportion of nave as regards length to width, height to wall-plate and to ridge, also of chancel to nave, &c., and of towers and spires generally? Any definitions would greatly help.—PERPLEXED STUDENT.

[5804.]—**Circus.**—Can any reader kindly inform me what materials are used for building the arena of a circus ring, also the depth required, and if there is any fixed diameter?—ISQUAER.

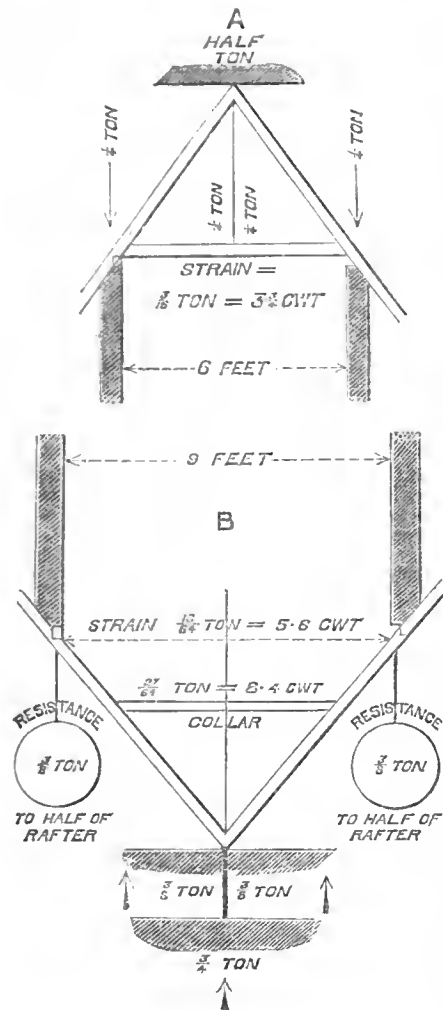
REPLIES.

[5728.]—**Coloured Stones.**—I am scarcely satisfied with the replies on this question. There has been a little too much of "red" imported, and yet an indeliteness even as to reds. I have since noted the large columns at the foot of the steps in Queen Victoria-street, at the Church of St. Andrew's by the Wardrobe, which are showing marked decay, and have been there only a few years. Is this Corshill? But as to coloured stones, the old offices of the "Crown Insurance Co.," in New Bridge-street, and the new offices near St. Dunstan's Church are good examples; but what are they? If some correspondent will enlighten us upon this, many of your readers will be glad. Could any information be obtained and samples seen at the Geological Museum?—J. W.

[5775.]—**Heating Kiln.**—Will J. A. Buck kindly furnish the following information as to the heating kiln he recommends:—What would be the cost of apparatus? The cost per diem of fuel consumed. The chamber to be heated would be 14ft. by 14ft. by 12ft. All the heat should proceed from below the level of the floor, the interior containing racks on which are placed frames for drying herbs. The greatest heat required would not exceed 140°. Perhaps "J. A. B." would say if in his opinion the apparatus of which he speaks is fit for the purpose.—H. D. II.

[5786.]—**Edington Church.**—In reply to "W. P.," we beg to say that the church of St. George, which has recently been pulled down and rebuilt, cannot be the very interesting church erected by Bishop Edington. This bishop lived during the middle of the 14th century, whilst the oldest portions of the old church in question were certainly not built before the commencement of the 16th century. It is therefore quite clear that this was not "the valuable stepping-stone in the history of English Architecture" that "W. P." imagines. He has apparently mistaken the Edington in Wiltshire, which has, we believe, a very fine specimen of an old village church, for Edington, near Bridgwater. We cannot find that Bishop Edington had any connection whatever with the last-named village.—EDWIN DOWNS AND SOX.

[557.]—Strains on Collar-Beam Roof.—Let us take a sketch, A, for an example with the collar—say,



6ft. long, and the rafter above it 5ft. long, and the height of ridge above the collar equal to 4ft., and let us consider the same as if the collar rested on the wall, and for the present suppose the walls to be only 6ft. apart. Then for a given length of roof covering to same assume the weight equal to one ton, then half a ton will bear on the walls and half a ton will exist at the ridge, being $\frac{1}{2}$ of a ton on either side, but this half ton will also be eventually carried by the walls, but will first exert its weight as follows:—The tops of the rafters will bear against each other with exactly the same power they exert against each other on the collar. And if the vertical pressure at the ridge is equal to $\frac{1}{2}$ of a ton on one side, then the horizontal strain on the half of the collar will be equal to $\frac{1}{2}$ of the $\frac{1}{2}$ ton = $\frac{1}{4}$ ton = $3\frac{1}{2}$ cwt. being in the ratio of half the length of the collar to the height of ridge above same, or in our case as 3 is to 4. It will be evident that the strain on the collar can only be equal to that we have already obtained, and which is due to the pressure on one side only by considering that the strains would be exactly the same if one side were a lean-to, fixed to an immovable wall, because as one side is as strong as the other neither side can exert a greater strain against the other than that due to its own weight, because otherwise it would overpower the other, which is equally powerful. If our rafters were already left below the collar one half their length above or equal to 7ft. 6in. long, and if we were to take this roof off the wall's 6ft. apart and put it on walls 9ft. apart, then there would result as per sketch, B,--wherein the roof is turned the reverse way up, as I think it may perhaps be thereby more readily realised—say, weight of roof $1\frac{1}{2}$ tons, and the sketches will explain themselves. But I will remark that the half of each rafter will place on each wall another $\frac{3}{4}$ ton, and which will be resisted as much as it resists, and therefore does not appear in the sketch; but the $\frac{3}{4}$ ton on each side which does appear is that which is resisted by the wall, but also resolves itself into horizontal pressure, and is equal to the $\frac{1}{4}$ ton strain at the plate level or to

$\frac{27}{64}$ ton strain at the collar. If the pitch be only half as much the strain on the collar will be double for the same weight—say, 17cwt.—and if to the given weight there be 17 collars, we shall have 17wt. strain on each, which a $\frac{1}{2}$ in. bolt nut and washer would more than equal.—HENRY ANDREWS.

[5790.]—Quantity Surveying.—It would depend much on the nature of the stonework of the building mentioned by "W." as to whether it took a long or short time to take out. But if only restricted to jambs, sills, and strings, I should think it could be easily worked off in 90 hours, that is supposing it to be abstracted and filled as fast as each trade was finished. It is best to commence with the joiner, as it gives more items for the abstractor.—E. C. P.

STATUES, MEMORIALS, &c.

WOLVERHAMPTON.—A statue of the Right Hon. C. P. Villiers has been unveiled at Wolverhampton. It is placed upon a pedestal of gray granite, weighing twelve tons, and is of colossal dimensions, measuring nine feet in height. It is chiselled in Sicilian marble, and is from the studio of Mr. William Theed, R.A. The cost was £1,000.

LEGAL INTELLIGENCE.

WHAT IS A HIGHWAY?—The Board of Works for the Poplar District v. the North Metropolitan Tramways Company.—This was an appeal from an order made by Mr. Lushington, the Thames-street Police-court magistrate, and was heard in Queen's Bench Division on May 14th, before Lord Chief Justice Cockburn and Mr. Justice Mellor. Before the magistrate a complaint had been preferred under the 75th Section of the Metropolitan Management Amendment Act (25 and 26 Vict. cap. 102), by the Clerk to the Poplar District Board of Works against the respondents that they had unlawfully erected stables beyond the general line of building in Blair-street, Bromley St. Leonard's, without the consent of the Metropolitan Board of Works, and the complaint had been dismissed with costs. It was then proved by the appellants that Blair-street is one of numerous roads laid out on a building estate; that it was opened for public traffic in January, 1877, and was lighted by public lamps, and that the sewer had been vested in the appellants, by whom connections with the houses had been sanctioned. It was further proved, that during the progress of the building of the stables in question, and about May, 1878, notice was given pursuant to the 76th section of the Metropolitan Management Act, 1855, by the builder, of the intention to build and drain, and that the appellants approved of the plan for drainage, and informed the said builder thereof, at the same time warning him that the buildings were in advance of the proper line, and that application should be made to the Metropolitan Board of Works, if it was desired to build up to the proposed line of building. This the respondents did not do; but without the sanction of the Metropolitan Board proceeded to build, bringing the walls within 50ft. from the highway. Blair-street is a "street" within the meaning of the Metropolitan Local Management Acts, 1855 and 1862. It is 40ft. wide, including footways, and except one vacant corner plot, has a continuous line of houses and buildings in various occupations on each side thereof, all of which buildings were erected, or in course of erection, in the summer of 1878. It is also a "new street" within section 112 of 25 and 26 Vic. cap. 102, the paving and the construction of the roadway being still incomplete, and the maintenance of the paving and roadway having so far been at the sole expense of the freeholder. The buildings erected by the respondents came up to and abut on the footway, but are about 5ft. in advance towards the centre of the street of the general line of buildings in the same street, as decided by the superintending architect of the Metropolitan Board of Works. The appellants contended that the 75th section of the Metropolitan Management Amendment Act, 1862 (25 and 26 Vic. cap. 102), applied to all "streets" within the Metropolitan, whether highways or not; that the fact of the *locus in quo* being laid out as a street for public traffic, conferred jurisdiction upon the superintending architect of the Metropolitan Board of Works to decide on the general line of buildings therein, irrespective of the question of property in the soil in the street; that the facts as to the lighting and sewerage executed by the appellants in the said street, showed conclusively that the 75th section applied, and that it was immaterial that the street had not become a highway. The respondents, on the other hand, contended that Blair-street being the freehold property of an individual, to which the public was admitted as of favour and not as of right, there being no dedication of the street to the public by user or otherwise, and it being within the freeholder's option to bar the access of the public to the street by the erection of gates or other proper method of obstruction, if it pleased him, it was not a highway at all within the meaning of the sections of the before recited Act. The magistrate was of opinion that the words of the 75th section implied the necessity that the street on which the building was erected should be not only a street, but a highway, to bring it within that section; that the acts of sewerage and lighting by the appellants being done by them under the powers and obligation respectively arising from the 69th and 130th sections of the 18th and 19th Vic., cap. 120, were no evidence that Blair-street had been dedicated to public use as a highway; and, in the absence of any such evidence, that the user shown was not sufficient to found a presumption of dedication, and that the freeholder had still a right, if he chose, to put up a bar across the said still unfinished street, and prevent the use thereof by the public. For these reasons the magistrate held that in deciding the general line of buildings in the street, the superintending architect of the Metropolitan

Board of Works had gone beyond his powers, and the respondents were, therefore, improperly summoned. The question turned on what is and what is not meant by a "highway" in the 75th section of the said act; Mr. Kemp, Q.C., for the respondents, contending that the word in the section referred to turnpike roads, and to such roads over which all the king's subjects have a right of passage. Thus Blair-street might be a street, but was not necessarily a highway. For the appellants Mr. Philbrick, Q.C., had urged that this section has reference to the ventilation of the streets and possibly to their architectural uniformity, and not at all to their use as a highway. The Lord Chief Justice considered that the word "highway" was used in the Act in a general and not in a technical sense as the part used for the purpose of travelling, and by the public. To him the case of "The Vestry of St. Mary, Islington v. Carrett (9 L. Rep. P. B. 278)," was conclusive. That case seems to have held this: In the Metropolitan Management Act, the expression new street is not confined to streets dedicated to the public. Held, that though the street may not have been dedicated to the public, it was a new street within the meaning of the 25th and 26th Victoria, chapter 102, section 112. The rule of Court, therefore, ordered that the judgment of the magistrate be reversed, and that the case be remitted to the magistrate, with the opinion of the Court, that the superintending architect had power to define the general line of buildings, though the place was not a highway dedicated to the public.

BREACH OF BUILDING ACT.—At Westminster, Mr. James Pullen Seagrave, of the Westminster Zinc Works, 46, Rochester-row, Westminster, was summoned last week by Mr. Edmund Drury, the district surveyor for St. Margaret and St. John, Westminster, for not giving two days' notice of his intention to erect a building at 13, Carey-street, Vincent-square, Westminster (18 and 19 Vic. cap. 122, sec. 41). He was also summoned under the 46th section for neglecting to inclose the building with walls of brick, stone, or other hard and incombustible substance (sec. 12, first schedule). The summonses related to a structure 20ft. by 15ft., on six iron pillars on wheels, with a vaulted roof, height from ground in centre 12ft. 6in. When first seen by the district surveyor it was not on wheels, but on stone bases let in the ground on concrete bottom, but was afterwards raised and put on wheels; it extended beyond the general line of front some distance, and about 3ft. above the height of the exterior wall of the premises. The magistrate had been to view the premises and the structure as it now was, and the district surveyor contended that it was a "building" within the meaning of the Building Act, and that under the 46th section the defendant, as the builder, was bound to inclose the building with incombustible material. The defendant said that whether on the bases alleged by the district surveyor or on wheels mattered little, for his contention was that in either sense it could not be a building; and when the surveyor saw it for the first time it certainly stood on the ground for the purposes of erection. Had it been erected originally on wheels it could not have been set properly square. He called it a "shelter" or "awning," and the Act under which he was summoned contemplated buildings—viz., structures, erections, or establishments, something permanent and fixed, but was silent as to what was a "building." He found by "Walker" that to build was to make a fabric or edifice on a foundation; that an "awning" was a covering spread over to keep out the weather; and that a "shelter" was something that covered from external injury, and this was all the alleged building was. It was moveable, and could be shipped from place to place, and was only intended to protect a brougham or two and a gig from the rain in the yard of Mr. Franks, the jobmaster, where it was situate. It had no sides or ends, and was never intended to have any, only a top, and if this were to be deemed to be a building, then the tents and awnings at the Horticultural-gardens, or the tarpaulin over a hayrick secured to poles well fastened in the ground must be buildings also. They were of combustible material, while his was a corrugated iron roof on iron pillars. Mr. D'Eyncourt agreed with the defendant that the Building Acts did not define a "building," but he took it that the Act was to be construed with regard to the surrounding circumstances of the cases brought under it. There could be little doubt that this was a "building" within the meaning of the Act, and had originally been intended to rest on the stone bases spoken of, but in order to evade the Act it had been placed on wheels. He had seen four or five men move it a little distance, but that, in his opinion, did not alter the case. From the holding in the case of "Stevens v. Gourley," reported in the *Law Journal Reports*, 1860, vol. 38, Part 2, "Cases at Common Law," he came to the conclusion that the present structure was a "building" within the meaning of the Act, and the defendant would be fined 1s. and 2s. costs on the first summons. With regard to the second, that was inapplicable; it was such a building that did not

require walls, and leave should have been asked of the Board of Works to build. The defendant asked what he was to do. His contract was completed, and the work done. Mr. D'Eyncourt said he had merely decided that it was a "building." Ultimately the second summons was adjourned for a month to enable the defendant to confer with the Board of Works on the matter. Mr. Seagrave produced his contract book to show that he had agreed to erect a portable corrugated iron roof to cover two or three carriages from the wet.

HOARDINGS.—At the Marylebone Police Court last week, Messrs. Langmead and Way, of 192, Gray's-inn-road, builders and contractors, were charged on a summons by Henry Tivy Tomkins, chief surveyor of Marylebone, with erecting and setting up at 119 and 120, Oxford-street, a certain board or fence for the purpose of depositing bricks or other materials in a manner not permitted by a certain licence granted by the vestry of Marylebone to them on May 16, 1879, whereby they had incurred a penalty of £5. Mr. Greenwell, vestry clerk, who prosecuted, said the defendants were employed by the owners of the premises, which were situate at the corner of Princes-street, to rebuild them. The defendants made application to the chief surveyor for permission to put up the proper hoarding, and a licence was granted by the officer to them to take up the pavement and erect a proper hoarding, the latter not to exceed 10ft. in height. There were also the usual stipulations as to a footpath, handrail, &c. The hoarding was erected soon afterwards, but instead of being 10ft. it was 25ft. in height. It consisted of wooden boards, which were covered by advertisements. The hoarding was also dangerous, as a high wind might blow it down. It was of the utmost importance in the public interest that the vestry should have the discretion as to what kinds of hoardings should be put up where the rebuilding of premises was going on. The rents received for hoardings to be used for the purpose of advertisements were sometimes so high that the builders or proprietors were induced to let the building go on slowly. For the defence it was contended that there was an unnecessary restriction in the licence, but Mr. D'Eyncourt pointed out that that should have been seen to at the time. After some further conversation, Mr. D'Eyncourt said the defendants had gone beyond the licence and had not shown the restrictions to be unreasonable. He should impose a penalty of £4 and 2s. costs.

CHIPS.

An organ, built by Messrs. Bevington and Sons, of Soho, was opened in Ulting Church, near Chelmsford, on Wednesday week. The case is of oak, and the front is decorated in gold and colours. A reredos is also about to be erected in this church.

The Guardians of Swansea have accepted the offer of Mr. S. Wyn, the contractor for the new block of buildings at the workhouse, to extend the same at either end, at an extra cost of £200, thus bringing the total amount of the accepted tender to £1,258.

The Town Council of Accrington decided on Monday to apply to the Local Government Board for sanction to borrow £89,000 for private improvements. The plans and sections for the proposed works have been prepared by Mr. Knowles, borough surveyor, and refer to 117 streets, having a total length of ten miles.

Our Office Table.

In the course of a lengthy description of the new offices of the Prudential Assurance Co., in Holborn, given with a good photo-lithograph of the building, the *Commercial World* gives details of the new pneumatic service of communication adopted in the building. In a central station, there are thirty-one pneumatic tubes, each terminating in a square receiver, having a slide in front, with a glass panel. The thirty-one tubes in this room correspond with the thirty-one divisions into which the business of the office is divided. Each one of these tubes is in direct communication with the chief clerk of the respective divisions. The secretary, say, desires information from department No. 1. He writes his requirement upon a sheet of paper, and, folding it, encloses it in a "carrier," which is a short metal cylinder fitting the pneumatic tube. Then, pressing a button, he signals to the operator in the central station that he desires him to receive a message. The operator, by means of an indicator, knows from which room or department the message is coming, and signals that he is ready to receive it. The secretary then places his "carrier" into the mouth of the tube, and does not further trouble himself until he sees the reply blown out of a tube and fall into a basket or receiver below. The operator now turns on a valve which connects the pneumatic tube from the secretary's room with the vacuum or exhaust chamber, when the ordinary pressure of the atmosphere acting upon the "carrier" at the other end of the tube, forces it almost instantaneously into the receiver at the central station. Taking the "carrier" he passes to the tube communicating with department No. 1. Drawing up the front of the receiver he inserts the "carrier," closes it again, and signals that a message is about to be sent. Immediately he turns the valve which connects the tube with the compressed air reservoir, and the message is instantly blown to its destination.

The date of the annual meeting of the Society for the Protection of Ancient Buildings has been altered from Thursday, June 26th, to the Saturday following, June 28th, at 3.30 p.m. at Willis's Rooms. At the last meeting of the Committee attention was called to the tower of the old church at Pinner, the top of which is to be rebuilt, and it was resolved that the church should be viewed and reported upon. We really think the Society may safely leave the architect under whose direction the work is being done at Pinner to mind his own business.

The buildings for the International Art Exhibition in the Crystal Palace at Munich, says a correspondent of *Galignani*, are rapidly approaching completion. The grand hall, a lofty apartment, 120ft. square and 70ft. in height, forms the central feature of the whole plan. The style of the hall is Renaissance. The decorative paintings in the domes and in the panels of the walls—allegorical tributes to the great masters

of all countries and of all ages, and emblematic of the various directions of art—are from the brushes of Professor Muller, Lindenschmitt, Wagner, and Spies, of Liezenmayer, Schraudolph, and Lossow. The four sides of this apartment open like triumphal arches into the adjoining halls, and the pediments of the great doorways are surmounted by colossal figures, dedicatory to all contributing nations. These are modelled by the sculptors Ungerer, Dennerlein, Ruhmann, Von Wahl, Professor Hess, Eberle, Hirt, and Ferd von Miller. The other halls and galleries, all intercommunicating, vary in their decorations, colour, and size; but all are of such extent that the 4,000 pictures and statues will have ample space. Towards the extreme right and left of the building are again two halls, higher than the other galleries—the one octagonal in form, with circular niches in the wall between the openings; the other oblong, with columns supporting a canopy, and each containing a fountain. These rooms are for the statuary. Other plastic works are distributed throughout the building. Architectural models, etchings, pencil and chalk drawings, as well as water-colour paintings, will be shown in rooms specially devoted to each. The international exhibitions are, in future, to take place every four years at Munich. The building within the Crystal Palace was, therefore, constructed in such a manner that it can be taken asunder in sections, and used again. About 4,000 contributions are expected.

A DEPUTATION from the Sanitary Institute of Great Britain waited upon the President of the Local Government Board, on Tuesday by appointment, to report as to the progress the Institute has made in the examinations of Local Surveyors and Inspectors of Nuisances. The deputation stated its wish that the President of the Local Government Board would send a delegate to a conference of the Council and other bodies, to be held at the Privy Seal Office, on Monday, June 16th, at 4 p.m., to meet the President of the Institute, His Grace the Duke of Northumberland, in order to confer on the subject of the examinations carried out by the Institute, and the appointment of visitors to the examinations. Mr. Selater Booth gave a most careful consideration to the various points submitted to him by the deputation, and promised that the subjects referred to him should receive every attention.

Mr. WILLIAM HAYWOOD, engineer and surveyor to the City of London Commissioners of Sewers, has reported to that body on the experiments with new gas lamps in Queen Victoria-street, made since March last, by and at the sole cost of the Gas Light and Coke Company. The burners are fitted with Sugg's London Argand governors and are of two sizes, consuming 22 and 50 cubic feet of gas per hour respectively. The smaller burners are placed in octagonal, the larger ones in dodecagonal lanterns. The 35 lamps replace 55 ordinary ones of 14 candle-power; the larger ones, five in number, are estimated at 200 candles photometric value, and the smaller ones, of which there are

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30, at 80 candles. On these data the 35 experimental lamps should give 4.42 times as much light as the 55 ordinary lamps. (These statistics as to illuminating power are supplied, it may be borne in mind, by the gas company.) The expense to the Commission of the latter is £268 2s. 6d., and the actual cost of the improved lamps, according to the gas company, on an estimate based on the same schedule of charges, is £777 2s. 6d.—a proportion of 2.82 to 1. It follows that the general result of the experiment is to give nearly four and a half times as much light at nearly three times the cost. While the experiment demonstrates that the public ways can be lighted in an ample and satisfactory manner by gas, the question to be considered, says Mr. Haywood, is whether the public necessities are such as to render generally necessary a more expensive mode of street-lighting than that now ordinarily in use.

The Court of the Plumbers' Company recently appointed a committee, consisting of Mr. George Shaw, the Master; Mr. Digby Seymour, Q.C., and Mr. Philip Wilkinson, to consider and report as to the best practical means of extending the utility of the company and elevating the character and educational standard of the workmen engaged in the trade of plumbing. The committee, after an exhaustive inquiry, have recommended that any workman belonging to the trade who produces evidence of having been for fifteen years in good and approved employment as a plumber, and of having done his work to the satisfaction of his master, and who furnishes vouchers of good personal character, should be eligible for admission, free of expense, to the freedom of the company, with its privileges and benefits; and next, that any workman belonging to the trade who should produce a certificate of having worked for at least ten years as a plumber under one approved employer by whom he should be recommended for his skill, proficiency, and good character, should on passing an examination by the Court as to his knowledge of the principles and practice of the art of plumbing, be entitled to a diploma under the Company's seal testifying in the language of their ancient charter, dated in 1365, that he knows how well and lawfully to work and to do his work.

The Municipality of Florence have resolved to hold in November next a great "retrospective exhibition," which shall bring under public observation in the most representative manner possible all the portable art treasures of Tuscany from the remotest times down to the 17th century inclusive. The exhibition will be held in the Pitti Palace. It will include not only pictures, statues, drawings, ancient and modern coins and medals, intaglios, cameos, &c., but also paintings on glass, goldsmiths' work, glass, enamels, mosses, furniture, marquetry, wax models, ivory carving, objects in terra-cotta, enamelled pottery by Luca della Robbia, majolica ware, silks and velvets, brocades, carpets, and laces. There will also be musical instruments, books, manuscripts, bookbinders' work; finally, embroidered cushions, carriages, litters, painted cabinets, optical and other physical instruments, watches, snuffboxes, objects in niello—in fact, objects of every kind remarkable in the history of art. One thing only will be missed in this representative exhibition—the frescoes which since the 14th century have been painted so profusely in all the cities and little towns of Tuscany. But an effort will be made to remedy this blank. Sketches representing those frescoes, with inscriptions indicating the places where they are to be found, will be placed upon the walls, so as to remind the visitors of their existence. There will be Etruscan antiquities from Volterra, Cortona, Arezzo, Pisa, Fiesole, and other places. As to the middle ages, it is expected that a valuable collection will be exhibited; and Tuscany possesses such an amazing quantity of art treasures from the 14th, 15th, and 16th centuries, that it is not easy to imagine how even the spacious rooms and corridors of the Pitti Palace itself will be able to contain even a goodly selection of them.

At the meeting of the Leeds School Board on Thursday, the sites and buildings committee recommended that as the schools now in course of erection nearly complete the school provision required for the borough, the remuneration to the architect to the board for any schools hereafter to be commenced be by commission instead of a fixed salary.

CHIPS.

The War Office and Admiralty have just ordered a large number of a small but, as experience proves, a very useful and necessary article in tropical climates—Atkins's charcoal pocket-filter—for shipment to the Cape for the use of the troops.

A Paris despatch states that the chief prizes of the Salon were awarded on Thursday week. The prix du Salon, 4,000 francs per annum for three years of foreign studies, goes to M. Flameng for his picture of the Girondins in prison, and the two honorary medals to M. Carolus Duran for two portraits, and M. de St. Marcieux for his sculpture, "Génie gardant le Secret de la Tombe."

The foundation-stone of a new Calvinistic Methodist chapel was held at Penygroes, eight miles from Llandilo, one day last week. It will seat 275 persons, and is to be completed by December 1st. Messrs. B. and E. Jenkins are the contractors.

The Stratford-on-Avon, Evesham, and Redditch Junction Railway was opened for traffic on Wednesday week. It continues the east and west junction system from Stratford to Broom, a distance of 7½ miles, where it joins the Midland Railway, and thus puts that system in direct communication with the Great Western and North Western systems. The new line was commenced about two years ago, the contractors being Messrs. Liddell and Barkley, who sublet the work in two sections, and the engineer is Mr. T. F. Burke, of Stratford. All the works are of substantial description, the bridges being solidly constructed of stone.

A stained glass window has just been placed in St. Mary's parish church, Dover. The subjects are, "The Presentation in the Temple," "Jesus Working as a Carpenter," "The Last Supper," and "The Crucifixion."

A new vicarage is about to be built at Rolvenden, East Kent, the tender of Mr. J. W. Bingham, of Headcorn, having been accepted for the work. Messrs. S. and A. Smith, of Hastings, are the architects.

At a meeting of the Southport Town Council on Tuesday evening, the tender of Messrs. Gripper and Bayliss, of Nottingham, to construct the promenade extension works in section No. 1 for the sum of £20,752, was accepted. It was also decided that the works comprised in section No. 2, for £10,410, should be offered to them. A large number of tenders were sent in—from Manchester, Liverpool, Leeds, Bradford, St. Helens, and other places.

A chancel organ was opened in the parish church of Alburgh, Norfolk, on the 30th ult. It was constructed by Messrs. Morten and Taylor, of Regent's Park. The case is of oak, panelled and stop-chamfered, with moulded angle posts, and has been designed by Mr. C. H. Lohr, of London. The pipes are displayed on three sides, and are of spotted metal, burnished in the Continental fashion.

The parish church of Burnham, Essex, is undergoing further restoration by the erection of 7 new windows in the chancel, at the expense of Sir Henry St. John Mildmay. The work is being executed by Mr. Charles Read, of Burnham.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Architectural Association. Dinner at Holborn Restaurant.

WEDNESDAY.—Society of Arts' Conversazione at South Kensington Museum.

British Archaeological Association. Papers on "Discovery of Roman Remains at Hampstead Norris," by W. Money, F.S.A.; "Coronation Medals of George II. by German Artists," by G. G. Adams, F.S.A.; and "Inscribed Stones on Ely Cathedral," by W. de Grey Birch, F.R.S.L., 8 p.m.

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See half-page Advt. in next Number.
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or, 19, Parliament-street, London.—[ADVT.]

Trade News.

WAGES MOVEMENT.

ARBROATH.—Notices having been posted in the workshops of Arbroath that after the 9th of June the hours would be 54 instead of 51 per week, the operative joiners have come out on strike against the movement. This is the first attempt to extend the hours of labour in the building trade in Scotland, and the result is looked for with much interest.

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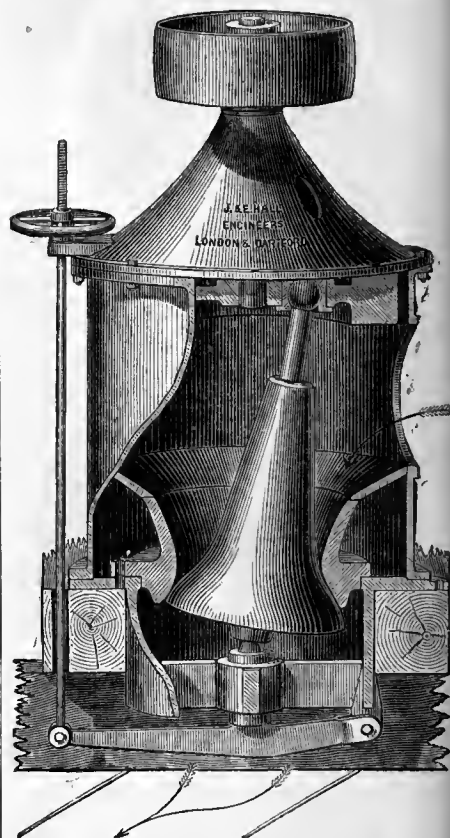
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THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 20, 1879.

HISTORICAL WINDOW-MAKING.

IN all ages and countries, where the climate has not allowed of hypæthral, or sky-open temples and other edifices, the window has been regarded as a most important part of the structure—next even to the door itself. It happens just now, however, that an Italian society of architects is engaged in discussing the question both of knowledge and of taste possessed by different generations of builders in this respect. The illustrations brought together are certainly interesting, from the Florentine, or purely Italian, point of view; but they are, to a disappointing extent, local, traditional, and narrow, leaving out of sight, indeed, those examples—which no student of the subject should omit—which adorn the shrines of Constantinople, the old English cathedrals, the châteaux of mediæval France, the mansions of modern Paris, and even the old churches of Berch-sur-Mer, Narbonne, and Toulouse. With respect to the structures at Constantinople, the first question raised was with respect to the position of the windows in the dome—an important matter, and one long discussed. In the result, in St. Sophia, there were introduced, in the mighty cupola, a number of small glazed archways, clustered close together, beneath the higher-springing pillars, producing a light so vivid that it seemed to separate the dome from the rest of the church, and this was considered a triumphant effect at the time. As to the use of windows in the Byzantine “*narthex*,” a difference of opinion and custom arose. Authorities varied as to whether the “*narthex*” should be regarded as simply an open portico in front of the nave, or an auxiliary roofed inclosure, similar to those at Cluny and Vézelay, though, undoubtedly, the earlier specimens were unroofed and unwallled, and had, therefore, no need of windows. We find, in fact, a transition from this style in the grated doors and cell-like apertures, encircled by masonry, which belong to the “*drum-headed*” churches of Constantinople, long after the consecration of St. Sophia, and which, it is affirmed, were, at a far later period, imitated in the chapels of Alnwick, in Northumberland, where the windows, in troublesome days, were always taken out of their frames and laid by, in expectation of more peaceful times. It was some such feeling, perhaps, that induced the architects of the fourteenth century to recommend that window-frames, for national edifices should, for the future, be constructed in iron, as was done in the case of St. Germain l’Auxerrois, at Paris, in which the masses of metal and of masonry employed were nearly equivalent. Upon a comparison of cost being made, however, the result was in favour of stone, and stone, therefore, was thenceforth employed. This latter point, moreover, was brought into salience by a curious memoir on “*military*,” or “*murderous*” windows, as they were styled, belonging clearly to the Middle Ages of war and intestine feud. One is a small square, another oblong. This takes the shape of an elongated slit, that of a narrow cross. The cross form, indeed, is frequently repeated, with variations of detail. Yet none of these light or loop-holes can be described as windows, in the proper sense of the term. They were simply apertures, serving as means of war, like those in the White Tower of London. Such, indeed, to a great extent,

were nearly all these constructions, until the builders of the Middle-Age churches perceived that they wanted something more than mere arrow-slits, and designed their arcade, “*bull’s-eye*,” right angle, basket, apsis, façade, and lateral wall windows, which, however, had had their natural predecessors long before. It was then asserted that the mason had too much of the work assigned him, and the glazier too little; but the discussion, at any rate, brought about some useful historical criticism—upon the Roman windows—simple bays, pierced in the surface wall, with frames of specially sculptured stone, and almost invariably arched, whether with columnar side-supports or not. It is a common mistake, however, to suppose that the horse-shoe window was a purely Saracenic invention; any more than the “*bull’s-eye*” was exclusively French. We have illustrations of all these styles, borrowed from various sources, at Ecouen, where the window expands into a vast field for the artist’s powers to work upon; at Beauvais, where the window seems like a door, richly illuminated by art to admit the light of nature; and at Arles, where it simply suggests the idea of one deep, struggling gloom confronting another. It is about this period that we find a wonderful commingling of fancies in window architecture—wheels, roses, stars, interlacings of arches, all well-known, of course to the chroniclers of the art, but, nevertheless, often too drily studied to be of popular or general utility. Yet, among them, few, perhaps, are more remarkable than the circumstances noted among the “*Histories and Researches of Sanval*,” who writes, in 1698, “*Dr. Martin Lister showed us over his hotel, which has large sash windows, which were made from a model that he had received from England, the method of counterbalancing the sash being at that time unknown or not in use in France.*” Nor has it been ever admitted; and France, singularly enough, is, in this matter, precisely as far behind the rest of the world as it was when Sterne wrote his “*Sentimental Journey*,” opened a window, and was not able to shut it. Indeed, this question of how to close windows, in churches especially, became an affair once of serious practical argument. Next to doors, clocks, and bells (says a monastic report of the fifteenth century), is the importance of window-fastening in churches. But this, of course, was an incidental subject. It is more interesting to consider what were the numbers, dimensions, and forms of these light-giving arrangements in the ancient or rather the older basilicas of Europe. In this inquiry we are very much helped by M. Alb. Lenoir’s “*Treatise on Monastic Architecture*.” He says that the windows of the earliest monastic churches were simply long openings in the walls, terminated at the top by an arch, and occasionally surmounted by a round aperture, covered in with glass and called an *oculus*, as, for instance, in St. Paul’s at Rome, though, apart from either pagan or Christian theory, the facts remain that there are 120 windows in St. Paul’s Cathedral, 80 in that of “*St. Peter of the Vatican*”—on a larger scale, however—and 102 in the Fane of Saint-Martin, erected by Perpetuas, who boasted that, for every door in the structure he had provided two windows, “*with movable blinds of marble.*” A very striking illustration of this is mentioned by M. Cæsar Daly, who found, in Brittany, fourteen years ago, a window, shaded by a stone cover, and protected also by iron bars, arranged cross-wise. Not very dissimilar is one belonging to the Guadagna Palace, near Palermo, a perfect specimen of Middle Age art, mingled with a little of the spirit of the Renaissance, as these influences grew up in Sicily. The palace itself is remarkable, being constructed of a perfectly black stone, encrusted with a kind of agate, after the fashion, somewhat, of the old castles and châteaux in

Auvergne, and the ecclesiastical edifices in that province even, amongst which the Cathedral of Puy to the eye of every tourist so prominently stands out. This window is “*bratised*” in a wall of plain masonry; it is enclosed within one pointed and two smaller but similar arches, divided by a spiral column, with elaborate decorations in a sort of platter-pattern, so to speak, on either side, very unlike the adornments of that which it was long agreed to term the Roman window; the rose, for instance, of which so lovely an illustration occurs in the church of Santa-Maria, at Toscanella, and of which we find hints in the celebrated “*Seals of Norwich*,” and the missal of Boxgrave, though the Roman fashion was, as a rule, to introduce an arch in the summit, even if it were of smaller dimensions than would be warranted by the lower parts of the work. The Latins and the Byzantines usually protected their windows by trellises, so to call them, of marble or of stone; but Gregory, of Tours, informs us that in France the custom commenced early of substituting for these materials simple wood, after which white and transparent glass began to take the place of all three, as elsewhere it had done indeed in a ruder Roman period. In the ninth century the church windows were filled with coloured glass, and in 1052 those of Saint Beniqué, at Dijon, representing the martyrdom of the patron, were described as pictures glowing with the holiness and the blood of martyrs. England, Sweden, and Denmark, at about the same date, bethought themselves of glazing in their ecclesiastical edifices, so long exposed to the merciless visitations of wind and weather; but, in spite of this, the windows of the Abbey of Jumièges long remained a marvel in Europe—an archaeological discovery, indeed. Its windows were the principal wonders of the edifice; they were pierced in the walls of the triple arcade at a great height from the ground, formed into the shape of leaves and Corinthian capitals, turned here into an Arab and there into an Oriental pattern, divided by pillars, yet united by long sweeps of harmonious decoration, and, reaching to the roof, were probably continued through it, a problem, however, which the most zealous archaeologists have not hitherto been enabled to solve. Nor has it been determined, with any approximation to certitude, whether they were, in either the ancient or the modern fashion, glazed or not, though it is interesting to note how, in the history of this subject, as substitutes for glazing, for the protection of windows in both religious and domestic use, so much care was bestowed on balconies and verandahs, as in Switzerland and Sweden, at Amboise and Baden—metal canopies and other contrivances for keeping out the wind and the rain, some of them undoubtedly characteristic and picturesque, but, for the great part, disfiguring and inharmonious. The history, by itself, of these attempts at preserving the architectural character of windows, without retaining them in their inclemency wherever chill climates demanded shelter, would be a chronicle of singular variety. Another stage is reached when we find fixed windows so oppressive to the frequenters or inmates of public or private edifices that the necessity of ventilators is insisted upon, as, in the fifteenth century at Caen, in the sixteenth, at Saint-Germain, near Paris, and even earlier, as the Italian Society reminds us, at Genzano, in the kingdom of Naples. There is a singular specimen of this novelty—as it was then regarded—in the “*Hospital of the Three Nurses*” at Narbonne, so named without any assignable reason, because every visitor to that city will have perceived that there are five figures of nurses, apparently, instead of three, sculptured over the principal doorway. It would seem, however, that here was tried, at a very early date, the experi-

ment of doubly-glazed, or doubly-shuttered, windows for infirmaries. They are totally dissimilar from what were termed the square "leathern" windows, dating so far back, in France, as the reign of the thirteenth Louis, which were supposed to exclude unwholesome or vitiating air from the galleries—as they were then termed—of hospitals and the chambers of palaces, and which were imitated, though in a coarse manner, throughout the latter half of the sixteenth century, when the "mezzanine" window came into vogue, and served so many social purposes, far less respectable than those of the *Napoleon Hospital at Berch-sur-Mer*, already spoken of, in the *Pas-de-Calais*, about thirty miles to the south of Boulogne, where the window is made a matter of the highest importance, and is styled "the guillotine," being tall and narrow, and, as the local architects declare, the nearest approach to the English system that can be conceived. Their idea is, that the whole of the space can be "aerated" above and below, by a simple and immediate shifting of sashes, almost in a moment, though, even at *Berch-sur-Mer*, the principles of compensating weights is not admitted. A point of interest is, whether through the various periods of history belonging, even apart from glass, to this most beautiful feature in architectural art, its full and perfect meaning was entertained. We cannot think otherwise, small as has been the attention given, either historically or critically, to the subject. For although, in architectural manuals, and other works of a similar class, the subject of windows, considered apart from their glazing, is, in a general sense, almost passed over; still the great builders must have met with many of their utmost difficulties, as they certainly achieved some among their mightiest triumphs, upon this path, which leads, no doubt, to high and to low, and involves many questions appertaining to higher interests than those consulted by *M. de Cambaceres* when he first drove in a carriage with glazed windows through the streets of Paris. These, however, are the mere filterings of a topic which has, in fact, a history and an antiquarianism of its own quite deserving of a place on a level with many others, upon which more may have been expended. It will be evident why, taking this point of view, we have left out of notice the glass-painting art and window restorations of the present day.

COMPETITION DESIGNS FOR THE WESLEYAN THEOLOGICAL INSTITUTE, NEAR BIRMINGHAM.


THE designs for the Wesleyan College, at Handsworth, now on view at the Wesleyan Centenary Hall, in Bishopsgate-street, present two distinct types of arrangement, while the exterior elevations are mainly in two varieties of style—Gothic and Renaissance. Mr. Waterhouse's selection, in the main, must be generally regarded as satisfactory, though it is certainly rather disappointing to find some very excellent and skilful designs in the cold shade. Mr. Waterhouse adds to his report the reasons that have influenced him in coming to a decision upon the forty-two designs. They are: "1st, their general adherence to the conditions, and especially to that of cost; 2nd, their general excellence, fitness for the special objects of the college, and for the site with its peculiarities of contour and aspect; 3rd, the evidence evinced by the drawings of their authors being skilful constructors and artists, and of their ability to carry out the work in a satisfactory way if confided to their care. I am well aware that it is rare indeed to find any one design pre-eminent in all these respects, and I do not pretend to have done so in the present instance. There is not a design in the room probably that you would wish to see carried

out without some modification. I must, however, compliment many of the competitors on the excellence of their work, which seems to me far above the average." The three designs which have been placed first by Mr. Waterhouse are "*Ut Migraturus Habita*," by Messrs. Ball and Goddard, of Birmingham; "*Wesleyan*," by Mr. C. O. Ellison, Liverpool; and "*Speramus*," by Messrs. F. and A. Wheelton, Birmingham, and H. Beck, London. The committee have unanimously chosen Messrs. Ball and Goddard to be the architects of the new college. The conditions required a building to accommodate seventy students, each to have a separate study and bed-room not less than 10ft. square, two rooms for assistant-tutor, a dining-hall, lecture-hall, six small lecture and class-rooms, library, professor's retiring-room and domestic offices, &c. A governor's house, with separate entrance, and two detached houses for professors, were to be provided. The buildings were to be plain, of brick, and the cost, including roads and fencing, not to exceed £23,000. The authors of the three have adopted a long front building, with transverse blocks, more or less pronounced, thrown out either in the rear or crossing the main line of building, and this seems to be the most commonly accepted block arrangement; while another class of designs adopt a quadrangular disposition, having one or more open quadrangles or courts in the centre. "*Ut Migraturus Habita*," is in a Late Gothic style, in red-brick and terracotta—two materials in which the referee has had, perhaps, more experience than any other living architect. Taking the plan, we are bound to admit its merits. It is U shaped in the distribution of the blocks. There is a centre entrance leading to a longitudinal corridor of considerable width at the back, lighted from the side courts behind. There is a wide arched hall with a lecture-room 48ft. by 30ft. in front, at both ends of which corridors give access to the class-rooms. Thus, the teaching block, with professors' rooms each side of entrance, occupies the central part of the plan, and is well located; the long lateral wings being divided into students' rooms and dormitories above. The library forms an advancing wing on the north-east angle, balanced by the governor's house at the other end of the façade, behind which and extended westward is the kitchen—court, and offices, the most unsatisfactory part of the planning. The studies are 10ft. square and extend along the front and through the north-east and south-west wings. At the extreme end of these wings are the latrines. On the first floor the same arrangement exists, excepting that the lecture-room and class-rooms are not carried up. The corridors are 8ft. and 7ft. wide, and those traversing the side wings are lighted by centre windows into the respective courts. The windows are in single and double lights, with flat-pointed heads under labels. The dining-hall, 48ft. by 30ft., at the south-west inner angle, is well placed for communication with the domestic offices, and is groined in four bays. The front hall, we find, is not dark, as in many other cases; it is lighted on each side of the lecture-hall block, and its centre also obtains light through the roof of the corridor which is kept low, between the vestibule and the lecture-room, while the latter is lighted on the south side by windows. The composition has been treated externally in a dignified and collegiate manner; a bold and massive tower, of good proportions, emphasises the entrance, while the bay window and gable end of library, and the governor's house, produce a well-balanced effect. The detail is also good, there are no extravagant or excessively-carved features; and the well-finished line and tinted elevations do ample justice to the design. "*Wesleyan*" is clever in detail, but more pretentious, unquiet and restless in style. We certainly

prefer the alternative lower elevation as more suitable and dignified than the modish semi-domestic treatment in the upper one, broken up by gables in pairs in a half-timbered style. The centre tower has an open pent roof, and rises out of a hipped roof of unpleasant proportions. The admirable sepia drawings are all cut round and mounted on toned paper. In the plan we observe a careful distribution of the main and teaching blocks, the corridors traverse the centre of each block, intersect, and are lighted at the ends; the class-rooms, library, and lecture-hall form an end block in the rear approached by a central corridor from the main entrance, 15ft. wide. The class-rooms are on the left, and the library and lecture-hall on the right side of this corridor. The domestic offices form the south-western block, and are inconveniently close to the dining-hall, which is placed between the kitchen and master's house. The tutors' rooms are obtained at the angles of the front block. The studies and bed-rooms have angle fire-places. We observe on the first floor the centre buildings are roofed low, and the corridors have lantern lights, and the access is by staircases at the angles of side wings and at end of east wing.

"*Speramus*" has certainly less to commend it as an elevation than some other designs. It is neither Gothic nor Classic in inspiration, though it has semi-Gothic features, and is commendable at least in its common-sense plainness. The towers or rather lanterns over the halls in the wings are heavy and unmeaning, and if they are intended to transmit light to the corridors they are certainly unnecessary; the centre treatment of bays and flat gables to the library and lecture-hall is unsatisfactory, while the lowness of this part, it being roofed back to the middle corridor, is unfortunate in the general grouping. On the other hand, the design has some good points in the planning. The main block has the lecture-hall and rooms made a prominent feature of in the front elevation; the central block, in fact, is devoted to the educational department, while the wings and return blocks, which latter cross at the ends, are given up to the students' rooms; these are 12ft. by 9ft. each, and ranged on each side of central corridors, and have angle fire-places. The corridors are lighted at the ends, and halls are shown at the junction of the long and end blocks which have the lanterns we have mentioned above. Another good feature in the plan is the central position of the kitchen offices behind; these are connected by a corridor with the main block. The master's house is at the west end joined by a passage to the wing. On the first floor the centre part is occupied by the housekeeper's, sick, and convalescent rooms behind corridor. With the exception of the ill-lighted corridors in the centre, the plan is economical, and the position of the domestic offices facilitates the working of the establishment. One very excellent design has scarcely met with the position its inherent merits deserve; we allude to "*Epworth*," the authorship of which is at once apparent to us as Mr. J. M. Brydon's work. It is well drawn, thoroughly artistic in spirit, in Late Gothic, of the scholastic type of which we have some noted examples at Oxford. The drawings are boldly, but heavily tinted, and display the hand of a true interpreter of the style. The front elevation has a massive square tower, with open stone traceried finish to the angle turrets in the centre marking the entrance, while the lecture-hall and library, class-rooms, and governor's house contribute to give an importance to the front that has been overlooked in all the three selected arrangements. The dining-hall placed at the back, with its bay recess and fleche, and the quadrangle elevation of front block are charmingly treated. Turning to the plan we find an inclosed square or quadrangle.

The teaching apartments, class-rooms, &c., form the main front block, the dining-hall projects into the quadrangle from the centre of the rear block, and the kitchen offices are well disposed of behind in a separate building connected to the last-named block by a passage. Centre corridors traverse the four main blocks, and are lighted at the ends, while the front corridor is lighted from the central area. The lecture-hall and library have bold square bays in front. It will thus be observed that the educational and domestic offices are central, and well placed as regards the students' rooms, which occupy the sides of the quadrangle. Below it we observe another design, "Centralisation" (Mr. H. W. Pratt), in which Gothic has been treated with success. Here, also, the library and lecture-room are made to play an important rôle in the design, though the division of the plan into two garden courts is undesirable, and the plan, clever in its administrative departments, is complex. "Lux et Aër" is a neat set of drawings in Gothic of some merit; the plan is symmetric, and consists of a double square, the hall and library being in front, with two quads, centre lecture-rooms, and dining-hall with kitchen offices behind, and forming a projecting block in the centre. A connecting corridor joins the large lecture-hall and library with the return-blocks, and these are of a plan with inverted outer angles. "Che Sara Sara," although it fails in plan, is one of the most unaffected and artistically-conceived elevations. It is in a quiet, Domestic Gothic style, but with a decided foreign flavour, reminding us much of Mr. Street's work. A charmingly simple octagon-fronted tower, terminating with a low roof (forming the internal staircase) flanks the entrance, while a row of gabled windows break the elevation. The corridors are imperfectly lighted, though skylights are marked at intervals; the dining-hall and lecture-room form a middle cross-block, and are both lighted from the roof. The domestic offices are placed in a distinct parallel block in the rear, making altogether four small open courts for light and air. The drawings indicate much feeling, and are tinted in a light but effective manner. "Proportion" in a triangle is a clever but over-elaborated plan, we believe by Mr. C. H. Driver. Its block arrangement consists of two elongated quadrangles, comprising four garden courts, which light outer corridors. The lecture-hall is central, opposite the entrance; the dining-hall and kitchen, also upon the same axis, have side corridor approaches, while the lecture and class-rooms and library are placed in front. The students' quarters occupy the blocks surrounding the courts, and the domestic department form the rear block. The author has well separated the educational from the domestic part, and the corridors receive direct light from the courts. Obviously the objection to this plan is that a large area is covered and long corridors are required. The elevations are Renaissance in character, broken by dormers emphasised by a central and lateral towers. "Quis" (Messrs. Tarring and Wilkinson, of Basinghall-street) is the motto of a carefully-prepared set, in which a 2nd floor is obtained. The plan consists of one main block behind, with two projecting wings at the end of it, and an advanced parallel block for the teaching-rooms and staff in front, connected by a centre corridor to the main building. The students are confined to the long block in the rear, the dining-hall is separated by a short corridor from the east wing, with the kitchen offices in the rear, while on the west side, quite detached, is the governor's house. East and west quads are obtained in the front, the main stairs are placed in a large hall at the junction of the cloister-approach with the front block, and the long corridor to the students' block is lighted at its ends.

For separation of the domestic and teaching departments the arrangement is a good one, and the stairs are central. Gothic of the 14th century is adopted, the groups are well broken, and though the detail of it here and there lacks scale (as in the turret), the design is in advance of many others in the style. Near this design we come to another in a species of Gothic now only known in old books of the style, and the work of forty years ago. "Res non Verba" is an expensively prepared set of plans on the long and three cross block system; the kitchen and dining-hall are in the centre block behind, and the lecture-hall an advanced building in front of the main students' block; but the plan is all breaks, and the author has shown as much unnecessary trouble to light his long corridor by gaps as others have neglected it. "Fleur de Lis" is the motto of another design of the conventional type. In this case the domestic offices form the west block or wing, with the dining-hall in the inner angle of it with the main block; the lecture-hall forms a corresponding building on the eastern angle. We cannot quite understand how the corridors are lighted, though there are courts for light at the junction with the extreme wings. On the upper floor the two halls are roofed, and the sick-rooms are obtained in the second floor of the centre portion of main block. A Late Tudor, with a centre square tower over the entrance, with an oriel of two stories and dormers along the front, are the chief features; but the three-story middle portion of the façade is heavy, and the whole is in a somewhat used-up phase of a costly style. "Ars et Labor" is a quadrangular arrangement with open centre area; the blocks intersect and have corridors lighted at the ends with four angle stairs. The library faces the entrance in centre, the kitchen and dining-hall are located in the rear block, and the master's house at south-west corner. One objection is that the lecture-room is over dining-hall. The design is in a bold Gothic, with a low tower, and dignified in general grouping; the wings are pronounced by gables and oriels, but the teaching and domestic arrangements are not well separated. "Suitability" is long and straggling, with four advancing wings in a feeble Gothic; "Health" is of the usual  shape, the corridors are lighted by octagon halls placed in the main block, which have the effect of breaking up the composition, and giving a very fragmentary effect to it—Gothic of a Late kind, good in detail, but rather effete, is adopted. "Experience" is undoubtedly clever in general design; the lecture-rooms are in a block behind, approached by a centre corridor; the domestic department and master's house form a rather confused west wing, the residential in front and east wing. The long passages in the domestic part are objectionable. Gothic of a Fourteenth Century type is chosen for one of the designs; the windows are pointed and traceried, and the gables and turrets costly. Scheme B shows a quadrangular arrangement, treated in a Perpendicular style with centre tower. "Fiat Justitia Ruat Cælum," is an extravagant proposal in four transverse blocks, leading from a front building; an alternative design shows a vast semicircular block with an inner corridor for students, and a lecture-room in the centre. "Wesley" is extravagant in its distribution; the lecture-hall and library are on either side of entrance, there is a lofty tower in the centre, but the roof is monotonous. "Comme il Faut" adopts a quadrangle arrangement and makes the lecture-hall the centre feature projecting into it; the dining-hall is in front, and is made a feature in elevation which is Renaissance, with centre tower, neatly drawn. "I look upon all the World as My Parish," is square with a quadrangle in centre; the library and dining-

hall are placed along front. The elevations are Late Gothic in dress, with pointed windows above, and central tower and oriel, clever in drawing. We prefer the back elevation. "Fides" is symmetrical, forms a double quadrangle with dining-hall and lecture-hall in centre, and class-rooms in front. The style is round-arched Gothic, heavy in grouping and disconnected. We can only name a few others which have lost sight of the conditions as to cost and economy. "Faith," shown in a crudely-coloured set of plans, adopts the usual plan; the domestic part is curiously articulated at the angles, with glazed doors for lights, Queen Anne in style with lofty tower. "Thanksgiving" is a neat set, but ill-considered in plan, Gothic in elevation. "Pense à Bien" is ill-disposed in a heavy Gothic; "X and Y" look like a row of ordinary houses, with no pretence to character in style, a quadrangle in plan; "Sperabimus" is the same in arrangement, Elizabethan in style. We may mention also: "Auxilio Divino," "Wesleyan," "N in Circle," "Air and Light," "Tenez," "Faith," "Economy," "Cross in Circle," "Spes," "Convenience," "Suitability," "In Due Season," &c., as other designs in which the authors have shown considerable care and skill, but little or no adaptation of plan to meet requirements, while in architectural design they have exceeded the limits of cost, or fallen below the standard of style. As will be observed, Gothic preponderates; there are only one or two attempts at Queen Anne, and a visitor might almost assume, but for the effete phaso chosen by a large number of the competitors, that the first-named style was the prevailing one. For collegiate buildings, undoubtedly, Late Gothic has many claims; it is the style almost consecrated by three centuries of use in our great educational centres, and, perhaps, no phase of Renaissance could be found so suited; but it is an expensive style, and the authorities have done wisely to select a design in which the simplest and most workable features of it have been employed, with a view to the materials suggested for the construction of the building.

THE INTERNATIONAL AGRICULTURAL EXHIBITION AT KILBURN.

CONSIDERABLE progress has been made at Kilburn in the preparatory works for the forthcoming Exhibition, the largest of the kind the Royal Agricultural Society has ever held. The site comprises upwards of 100 acres of land: between the North London Railway on the north and the North-Western Railway on the south, being bounded on the west side by Salusbury-road. Two railway stations are in immediate proximity to the ground, one being the new station of the last-named road on the London and North-Western, in course of construction, and the other Kensal Green Station on the North London Railway. Between these two lines the plot of land forms a level area of trapezoidal shape, and until recently drained was in a waterlogged condition; it is now drained and covered by cattle and implement sheds, arranged in rows between avenues. We have paid a visit to the exhibition site, and can give our readers some idea of the works and erections now being pushed on with ceaseless activity for the show, which is advertised to be opened to the public on the 30th of the present month. Entering the show ground, we find that the sheds and standings have been arranged chiefly in parallel rows running east and west, and these are crossed by a central avenue of nearly 300ft. wide, in a north and south direction, besides another narrower avenue from the Salusbury-road entrance running in the other direction. These cross entrance roads leave four unequal groups of sheds. Those on the east side of

the chief railway entrance are implement-sheds, of which there are 6 parallel rows, each row of about a dozen sheds. The cattle and sheep are to be located in rows of similarly constructed sheds on the west side of main avenue. Walking through between the rows of these erections we notice that the implement sheds are 20ft. wide, with about a space of the same distance between them, and constructed of posts 3½ in. by 3 in. and 7 in. by 3 in. at the angles. The posts are held together at the top by ties strengthened by pieces of flat bar-iron. The rafters are placed one above each upright and one between, and spiked down to the plate, and they are tied by a collar; the framing thus constructed will be covered with canvas. The sheds for machinery in motion occupy the north and south sides of the ground, and are several hundred feet in length. Each shed is 25ft. wide, with a space of 15ft. to 20ft. apart. The uprights are stouter, and the main rafters are cross-braced, and the whole of the timbers are put together by bed-bolts. The sheds are canvas-covered, the canvas being supplied by Mr. Unite, of Edgware-road. The boundary of the site on the east and return ends is surrounded by stands for seeds and models. These are of uprights covered on the sides with weather boarding. The roof is felted. One of the main entrances, composed of a structure of a more finished and durable character, forms the centre of the eastern boundary along Salusbury-road. It is a long low range of wooden buildings of architectural pretensions, with a clock-turret in the centre, adorned by a pediment, and supported by raupis. The clock has been provided by J. Bennett. A row of turnstiles occupies the centre, while the ends have pedimented wings for official and other uses. Exactly opposite this entrance is one of the main avenues we have mentioned, about 100ft. in width, and from this point to the Kensal-green entrance a steam passenger tramway is forming, which will convey visitors from one end of the show grounds to the other. The tram will be worked by Messrs. Fowler, of Leeds, who have adopted a 2ft. gauge. Passing up this avenue a few hundred yards, we arrive at the junction of the main avenue, and on our right in the wide open space we see a large timber building with a projecting clock-tower in front, which is intended as the members' club. It is certainly the most architectural erection in the whole ground, its clock-tower forming a centre object from the railway entrance facing the main avenue. The main structure is rectangular, constructed with louver boarding along the top and weather boarded. It is of considerable width, and has braced principals, and the interior is fitted with rows of tables and seats. The tower, however, has the greater claim to notice. Constructed of wrought timbering, it rises to a height of 60 or 70ft., and is framed with timbers in stages which cross at the angles and project. The upper story of the tower is tastefully finished; the horizontal timbers protrude at the corners and form ornamental brackets, which carry small pillars of wood supporting the projecting eaves of the roof. Mr. G. Hunt, of Evesham and Regent-street, the surveyor to the Society, was the architect of this building, and we believe the clock will be supplied by Mr. Benson. Turning from the clubhouse southwards and proceeding up the avenue, we notice another ornamental structure of wood on a cruciform plan, the ends of which are finished polygonally and hipped, and having widely projecting rafters, supported by cut brackets painted of a red colour. This is called the "bodega," where Spanish wines will be sold. Like the last, it is constructed of wrought timbers, panelled below with arched sash-lights, and is surrounded by a counter for the supply of refreshments. In the centre of the long wings are tables. The structure is painted in too

garish and ill-assorted colours—a bright red and a yellow or buff. Other erections or refreshment saloons are in progress, and the main avenue has already a particularly busy and gala appearance, which will be increased as the implements, cattle, and other exhibits arrive. We think something might have been done to make these central vistas of the show a little more artistic. The open space it affords for exhibits of all kinds might be utilised in other ways than by refreshment saloons. On each side model cottages for labourers, large models of agricultural buildings, conservatories, and garden accessories might be arranged with considerable effect, and the great show on the Champ de Mars be repeated in a more modest way. There are hundreds of manufacturers who would have gladly contributed exhibits of this kind to show if they had known they would be granted one of the main approaches. Greenhouse buildings, stables and their fittings, iron park-gates, zinc roofing, concrete construction, and building materials and appliances, sanitary improvements generally, are clearly within the scope of a great agricultural exhibition, and we shall be surprised if these are not represented largely at the forthcoming show. We are glad at least to find that one of the buildings in the main avenue is to be used for the exhibition of designs and models for farmsteadings, and fittings on a large scale, and we believe one of the undoubted benefits this society can confer would be the promotion of competitions for the improvement of farm buildings. We may justly expect to see the results of the experience of other nations in these exhibitions not confined to agricultural implements and mechanical improvements merely, but extended to architectural efforts as well. An interesting department will be the International Dairy shed, where butter and cheese will be made by machinery. The whole of the buildings and the drainage of the site—an operation that has taxed the resources and patience of the officials during the late wet season—have been carried out under the personal superintendence of Messrs. Thomas Penny and Son, of Taunton, the superintendents of works to the society. The land drainage, we hear, has cost £2,500, and looking at the work that has been performed, and the formation of roads, considerable credit is due to those intrusted with the undertaking. We understand the whole of the erections will be sold by public competition after the close of the Exhibition.

THE ARCHEOLOGY OF ADEL CHURCH.*

WE have received a copy of a work upon the archaeology of this very remarkable Norman church, of the West Riding of Yorkshire, a building little known probably to some of our readers, but one of extreme value to the antiquarian, and particularly rich in the symbolic art and the grotesques of the period. The author, the Rev. Henry Trail Simpson, M.A., late rector of Adel, appears to have devoted a considerable portion of his life to the delineation of the topography and historical associations of this parish; and in the "Letter Dedicatory" to the members of the Royal Archaeological Society, who visited the parish in 1866, he states the idea of publishing the work was suggested to him by that visit. At that examination a curious stone, remarkably incised, was discovered jutting out from the north-west corner of the foundation, which led to the discovery of many others of a similar kind, which are deposited in the vestry, and which are described and engraved in Mr. Simpson's book. Adel is made the subject of a learned dissertation in the opening chapter, in which its

* *Archeologia Adelenensis; or a History of the Parish of Adel.* By HENRY TRAIL SIMPSON, M.A. London: W. H. Allen & Co., Waterloo-place.

name and topography are discussed. The etymology of the word "Adel" has undergone various changes. "Addle" and "Adhill" have been used in previous times, and the term is probably a corruption. The author supposes that a Phœnician colony might have existed at Adel, and the worship of their goddess Aidan been established—hence the name Adhill or Adan-hill, and that the word Adel signifies great or powerful god. But we pass on to speak of the remarkable relics that are deposited in the vestry. These consist of incised stones, "querns," round, flat, or conical stones for grinding corn, "Saxon wheel-crosses" as they have been called, and an ancient stoup or mortar with sculptured figures on three sides, on one of which is a heart and on another a human figure with serpents on each side—to all appearance a mythological symbol. A similar figure occurs at Ilkley, which is engraved also. Three Roman altars, moulded and sculptured, and the "capital of a Roman column"—though we cannot, from the engraving, believe it to be one—are among the other relics. Stone coffins, of plain Norman character, are to be seen in the churchyard, one with a lid. The author shows that there was a Roman station at Adel: this is proved by the remains found in the common and neighbourhood; the church is supposed to have been constructed of materials used before for building, and it is conjectured that some Roman building at Blackhill was broken up and used for the church. A more probable idea is, that the Saxon church mentioned by Whitaker at Blackhill supplied the materials, and the Saxon wheel-crosses we have mentioned seem to indicate this origin. Numerous allusions are quoted bearing upon the antiquities at Adel, the gist of which goes to throw light upon the relics, while the Adel altar, inscribed to the goddess of the Brigantes, proves the antiquity of the parish. Remains of pottery, encampments, and altars have been found at Blackhill, Adel Mill, Rombalds Moor, Wakefield, and Ilkley. As regards the church, it is claimed that the building is an entire specimen of Norman, unalloyed with admixtures of later date. In Part II. the author traces the vestiges of ancient religions, and tries to establish the fact that the district of Elmete was formerly a religious district of remarkable character. We cannot follow Mr. Simpson in his references to primeval creeds as illustrated at Adel, though we fully agree with him that heathen and revealed types of religious worship often correspond with each other. It is asserted that the huge temples and circles of Avebury or Stonehenge represented the sinuosity of the form of the serpent, but we are not justified in accepting this idea as an established fact. We leave this portion of the work to the archaeologist interested in symbolic representation, and refer to the singular stones and carved work at Adel. The author thinks the stones discovered at Adel, already mentioned, with their rude sculpture, take us back to a period earlier than the 9th or 10th century, for "if the present church of Adel was built in 1135 A.D., there must have been a church at Adel prior to this rebuilding, probably a Saxon church erected under the auspices of Paulinus." He does not think they are Christian, and he cannot see, as some have done, that they have the rudiments of a cross upon them. "In fact," he observes, "I imagine them to be Saxon monuments of a heathenish character, and not Christian." There is certainly, from the engraved representations of these stones given, a strong presumption for thinking them to be heathen in conception and execution. They all bear, besides Runic characters, the phallic circle and central cross, with other symbolic incisions of the sun and moon. The engravings given of them represent them as about 3ft., or 2ft. 9in. by 1ft. 4in. and 1ft. 9in., and of

irregular shape, rounded at the top. Some of the devices show concentric circles, others have intersecting arcs, a series of semi-circles with a boss representing the sun, rays, &c. Mr. Simpson mentions similar stones that have been found at Thurnby, Leicestershire, Rombalds Moor, &c. The former are illustrated, and show a series of straight lines of cross-like character. Of the exterior of the church several sculptures of a typical character are illustrated. The cuts given of Adel Church in its present and restored conditions are not good of their kind; but we are led to follow the explanations offered of the plan, the large churchyard, and sculpture. The large and bleak churchyard is thought to be emblematic of the world, barren and waste, the church the ark, while to the windows are attributed a symbolic meaning. One singular grotesque is a head of a monster on the apex of the gable of the beautiful south Norman porch; the author observes that it is intended as the image of Satan, and its position here was to thwart man on his first attempt to escape from the effects of sin. Below the apex in the tympanum are rude sculptures of the cross, the *Agnus Dei*, and, just above the arch crown, the Saviour on His throne. In the side spandrels are representations of SS. Mark, Matthew, John, and Luke, while the sun and moon occupy triangular spaces between these and the centre subjects. The symbolism is carried out in the capitals of the outer arches, but we hesitate to think the zigzag or dental enrichment round the arch is emblematic of the brilliancy of the rainbow that encircles the throne. Leading up to the enthronement, over arch, are two stems, on the east side, a single stem dividing into four branches, each having a serpent's head; and on the west side two stems dividing into four, ending in some flower. The former is thought to illustrate the Fall of Man, and the four rivers the acknowledged symbol of the four Gospels, the others illustrative of the Law and the Prophets. The corbel line of heads along the eaves is interesting, but the drawing scarcely does justice to so unique an example. The heads are chiefly grotesque, the stones of arcade being simply moulded with a double round in each half of the corbel. The channel arch is a splendid specimen of three orders, the outer order enriched with the dog-tooth and a row of grotesque heads, each with the mouth open ejecting monstrous products; the next is a cable line, and the lower the zigzag. We have no further space to describe the capitals and their symbolic significance, but only to remark that the whole of the sculpture, both without and within, is intended to convey the Christian's perpetual conflict with the world and evil spirit. The Norman font and windows are also described and illustrated, and the book will be read with interest by admirers of Early Norman art. The frontispiece does scant justice to the church, and we may refer the reader to a better illustration of it that appeared in the *BUILDING NEWS*, Vol. XXVIII., for April 30th, 1875, wherein plan and details of the font also will be found.

THE RECENT EXCAVATIONS OF THE ROMAN FORUM.*

(Continued from p. 673.)

THE whole of the south-western side of that part of the Forum called by some authors the mid-Forum, is bounded by one of the sides of the Basilica Julia, occupying a rectangular space of about 400 by 160 ft.; the inclosure was formed by an arcade of which there are considerable remains at the west corner, where owing to the rapid rise of the ground next the *Vicus Juguarinus*, this corner of the building was constructed against the sides of the hill, and having become

buried by the falling of the hill-side, has been better preserved to us than the other portions. Abundant evidence, however, has been found amongst the fragments of the building to enable a restoration to be made of part of the inclosing colonnade, which has been done by Signor Rossa, who has also caused brick piers to be built indicating the position of the piers of the entire building. Antiquarians seemed to be quite agreed that this edifice was begun by Julius Caesar and finished by Augustus, who afterwards rebuilt the original edifice on a more extensive scale after the destruction by fire of the first building. The honour of this restoration was attributed by the Emperor to his grandsons and adopted sons Lucius and Caius, and the Basilica for a time was known by their names; it was repaired in the second century and underwent some restoration in the reign of Dioclesian, but the architectural features of the building of Augustus appear to have been preserved. This Basilica was the court of the *Centum Viri*, which had in the time of the younger Pliny, who practised before it, not less than 180 judges, and it is mentioned by Dio as one of the places in which the Emperor Trajan sat to administer judgment; it was surrounded on three sides by streets, the *Vicus Juguarinus* already referred to on the north-west; on the northern side was the principal street, part of the *Via Sacra*, which traversed the Forum in the direction of its length; and on the south-eastern side it is bounded by a street identified as the *Vicus Tuscorum*, which is known to have led from the Forum to the Velabrum and where now stand the church of St. Giorgio in Velabro, lately become more known to us as being connected with our English Cardinal Newman, and the *Circus Maximus*: this street vies with the *Via Sacra* in its frequent mention by ancient writers and in its religious character: being the route taken by the great processions on the occasion of the *Ludi Romani*, in which the statues of the gods were carried on cars from the Capitol through the Forum to the *Circus Maximus* at the back of the Palatine Hill. The *Vicus Tuscorum* had also the character of a busy and fashionable tradesmen's quarter, and was considered as the Bond Street of Rome, in later times it was called *Vicus Juguarinus*, apparently from the spice shops which were situated there; in the time of Plautus the neighbourhood of this street and the district behind the Temple of Castor had a bad reputation as the haunt of rogues and infamous persons. The remains of a ruined pedestal about 10 ft. by 8 ft. has been uncovered at the north-east corner of the Basilica of the statue of Vertumnus. The whole of the Basilica Julia is covered with paving, that of the arcades being of, I believe, Travertine stone, and the centre portion with yellow and black marble, all perfectly level but much crushed and fractured; the paving of the arcades has been properly repaired. On the pavement of the arcades, especially on the north-east next the Forum, there are many inscriptions and also a number of rudely incised figures, most of them being circles variously divided, one I noticed being rectangular in form; these are supposed to have been made by boys for playing games; there are also rude imitations of other objects, one intended to represent an owl, one a branch of a tree and other subjects: Opposite to the Basilica on the N.E. side of the *Via Sacra* formerly stood the Tabernæ or shops of the Forum, originally founded by King Tarquinius Priscus; they were naturally then required for the trades generally carried on in a market-place, hence the butchers' stalls, from one of which Virginius took the knife to stab his daughter. The schools for children were also among the shops in the forum, and it is said to be there that Appius Claudius first saw Virginia reading. In ancient times there appear to have been two rows of these shops at first used for general market purposes, but afterwards more particularly as jewellers' shops; no doubt very shallow, like the shops on one of the bridges at Florence or on the Rialto at Venice, or like the Pantiles at Tunbridge Wells. They were standing in the times of Cicero and Livy, but they were burnt down shortly after the death of Agrippa, B.C. 12; and we may doubt whether what was then destroyed was ever rebuilt, as we now find seven low brick piers about 13 ft. square, supposed to be the remains of pedestals on which statues or columns were placed. Some fragments of statues have been found amongst the excavated ruins, which it is asserted are part of statues

formerly placed on these pedestals; if so, they must have been quite small and probably numerous. In the open spaces of the mid-Forum, near its most western side, is the monument of Phocas, consisting of a Corinthian column which long stood with its base buried in the Campo Vaccino; it was supposed until 1813, when its base was excavated, to be the remains of a temple. It was then found to stand on an isolated pedestal mounted on a broad square base of tufa masonry and brickwork; and the pedestal bore an inscription which shows it to have been erected A.D. 605 by the Exarch Smaragdus, in honour of the Emperor Phocas, probably the last of the triumphal buildings erected on the Forum. Near the eastern corner of the base of the column of Phocas is one of the most interesting monuments which have been discovered during the recent excavations in the Forum. It consists of two marble slabs, about placed parallel to each other, a short distance apart. Antiquarians call them *Plutei*, and suppose that their use was to form a gangway through which who coming to vote could as they passed in single file deposit their voting ticket. They were discovered in 1873. The outside of each slab is carved with bas-reliefs of a very fine character, and not greatly injured on the inside. Each bas-relief is represented the same subject, namely, a bull, a sheep, and a pig, prepared for the *Secovotantia Sacrificia*. The sculpture on the external faces represents two scenes, which are differently described by antiquarians—one attributing them to scenes in the life of Domitian, another to scenes in the life of Titus (and this seems to be the most accepted explanation), and another to scenes in the life of Septimius Severus. However, these we may leave for antiquarians to discuss and settle, and proceed to describe what has the more special interest for us, namely, the backgrounds of the sculpture scenes represented on the outer faces of the *Plutei*; and this I propose to do in the words of the author already referred to, Mr. A. Nicholls. When we turn to the backgrounds of the two bas-reliefs we find that they both represent the scene that was in reality before the spectator (the Forum Romanum), and in this lies the important topographical interest of the sculptures.

The locality of (what our author supposes to be) the Burning of the Registers is most easily recognised, and may be conveniently taken first. In the foreground to the left of the spectator is a fig-tree, and next it a statue on a pedestal. In the background behind the figures were five arches of a building divided by piers with half-columns, or pilasters of the Tuscan order. At a short distance from the end of this building is a hexastyle Ionic portico with a pediment. Then after a short interval, through which an arch is seen in the further distance, is another hexastyle portico and pediment with Corinthian columns. A part of the bas-relief to the right is lost, but in the foreground is a portion of the rostra upon which the Emperor was seated. In order to identify the scene, it is only necessary for the spectator to turn from the sculpture to the ruined buildings before him. In the Corinthian columns of the Temple of Vespasian he will recognise the remains of the Corinthian portico, in the portico of Saturn the Ionic portico of the bas-relief. The arch seen in the distance between the two porticoes would probably be a part of the loggia of the tabularium. The long line of arches with piers between them will be found in the Basilica Julia, with its ornaments of Tuscan architecture. The whole of the background may thus be explained by the aid of the ruins which remain. Of the objects represented in the foreground no distinct traces are now to be seen. They consist, as has been mentioned, of the rostra to the right and a fig-tree and statue to the left. On the other bas-relief, which is more perfect than the first, the same statue and fig-tree are seen in the foreground; on the right and next to them behind the figures are seven arches with intermediate piers similar to those of the first sculpture. Then after an interval of some width is a Corinthian portico, which is represented as having five columns, and finally to the left an arch which appears nearer to the spectator than the portico. In the foreground are the rostra, from which the Emperor is speaking. It will be observed that in the foreground of each sculpture we have the rostra on one side and the statue and fig-tree on the other, but in one representation the rostra are on the right, in the other on the left. In the two scenes the spectator is supposed to be placed on different sides

* A paper by EDWARD TANSON, F.G.S., F.R.I.B.A., read before the Royal Institute of British Architects, June 9, 1879.

of the rostra, but in both cases the statue and fig-tree are seen in the same relative position or nearly so, the tree to the left of the statue. In order that these two objects should be so seen from the right and left of the rostra we must suppose both of them to have been before the rostra at about equal distances from it. Thus, though the spectator has changed his position from one side of the rostra to the other, his situation with reference to the statue and fig-tree remains nearly as before, and as the one sculpture ends with those objects on the left, and the other begins with them on the right, the background of the buildings behind these two objects in the second sculpture may be expected to begin at about the same point where it terminated in the first. With this clue we find in the piers and arches of the second bas-relief a continuation of the long colonnade of the Basilica Julia. In the wide interval to the left of the basilica the portico of the Temple of Castor might be expected to be seen, but the artist has not thought fit to introduce this monument, possibly because hidden from the rostra by some nearer objects. In the portico with the Corinthian columns we may recognise the Temple of Divus Julius, the podium of which has been recently excavated, and which is represented in medals of Augustus and Hadrian with a tetrastyle Corinthian portico. The five columns may be assumed to be a mistake, as this form of portico is unknown. The arch behind the rostra was probably that of Augustus, of which we have some obscure mention as standing near the Temple of Julius. The explanation here given of the first background (in which the Temples of Vespasian and Saturn appear) agrees with that of Signor Brizio. In the other background that learned antiquary thought we might find the Basilica Emilia and some other buildings of the north-eastern side of the Forum. This opinion was founded on the supposition that the two views were taken in opposite directions, a supposition which is contradicted by the similar relative position of the statue and fig-tree in both scenes. The two sculptures are in fact united by the recurrence of these objects, and present us with a partial panorama comprehending the south-east, south-west, and part of the north-west side of the Forum as seen from the neighbourhood of the rostra. We may now turn to the identification of the objects in the foreground. Among these are the rostra of the Forum. The removal of this monument from its site at the edge of the Comitium, where it stood till the time of Cicero, is testified by Dion and Asconius, but its subsequent position has not been ascertained, except so far as the sculpture before us enables us to do so. The statue seen in both the bas-reliefs represents a figure nearly nude, but shod with a sort of loose boots. On his left shoulder he bears a full wine-skin, and his right arm (which is lost in both sculptures) appears to have been raised in the air. This figure has been recognised as that of Marsyas, who is represented with the attributes of a satyr or Silenus, a character ascribed to him by Herodotus and Pausanias. To those who desire to carry further the inferences which the author so largely quoted has arrived at, I refer to the second chapter of his book, in which he concludes that these bas-relief enable us to determine with accuracy the position of the equestrian statue of Domitian, the Lucus Curtius, the statue of Marsyas, and the rostra; but excepting the ruined base of the equestrian statue no trace of either of the other monuments remains. On the north-eastern side of the Forum may be seen some traces of the ancient Via Sacra. The south-eastern end of the mid-Forum is bounded by a cross road extending from the N.W. corner of the Temple of Pollux in a north-eastern direction until it joins the Via Sacra. Before leaving the mid-Forum, I should refer to the Cloaca Maxima, which is in part uncovered, and can well be traced passing under the Basilica Julia, and obliquely nearly in a northerly direction until it is lost under the still unexcavated bank on the N.E. side of the Forum. The surface of the Forum, as we now find it, is paved where it was intended for the use of carriages with large polygonal blocks of hard grey volcanic stone, called by the ancients *silex*, although its composition in fact does in no way correspond with the meaning of this term as used in science, and where it is intended for foot-passengers only, with rectangular slabs of Travertine stone. The ruts caused by the chariot wheels, as at Pompeii, are very noticeable, especially at the sharp turn of the road at the corner of the Temple of Castor, and from some cause which I find it difficult to

explain, the stones, and it is the same at Pompeii, are worn away at the joints, so that each stone presents a convex surface; at one part of the roadway near the bottom of the Clivus Capitolinus, is a more perfect portion of the roadway where the joints are well squared, apparently more recent and less worn, and where the rounding of the edges is not perceptible. Adjoining the Vicus Tuscus at the south-eastern end of the Forum are three Corinthian columns which formed one of the landmarks of Campo Vaccino, formerly known by the name of Jupiter Stator. Canina at one time considered them as part of the Curia Julia, but they are now recognised as the Temple of Castor and Pollux, the divine twins, whose supernatural interpositions are so curiously interwoven with the traditions of the early struggles of Rome. The Temple of Castor—originally built 482 B.C.—was rebuilt by L. Melittus Dalmaticus B.C. 119, and whatever may have been the character of the original temples, the edifice of Melittus was one of considerable size and importance, and was frequently used for the meetings of the Senate. This temple was amongst the numerous public edifices which were rebuilt in the time of Augustus; it was erected by Tiberius, in his own name, and that of his brother Drusus, out of the spoils of the German campaign, and although dedicated to two divinities it generally bore the name of Castor only. About 20 feet from the eastern corner of the steps of Castor are the remains of a low round construction, apparently a basin of water, which is probably the Lake of Jemena, and the pool or spring referred to in early story at which Castor and Pollux gave water to their heated steeds after the battle of the Lake Regillus. A little further east is the round podium of a circular building, which is supposed to be the remains of the Temple of Vesta, but authorities, as usual, differ on this point. The age of the temple which existed in the time of Augustus, and which was then covered by a bronze dome, is unknown—it was burnt down in the great fire of Nero, and was probably built by Vespasian, but again burnt down during the reign of Commodus. The temple must, judging from the size of the ruins of the base, have been quite small, and the fact of its having been, in the time of Augustus, covered by a bronze dome seems to strengthen this conclusion. On the southern side of the temple are some ruins half hid in the still unexcavated bank, which probably occupy the site of the houses of the Vestal Virgins. North-east of the Temple of Castor and Pollux are the ruins of a podium of a temple, which it is believed faced N.W. toward the Capitol, and is supposed to have been built on the spot where Cæsar's body was burnt. On the site of the cremation the partisans of the Dictator, very soon after the event, placed a column, described as Numidian marble nearly 20ft. high, and inscribing "Parenti Patrie"—and before the column was an altar; the column and altar were afterwards removed by Dolabella, and the Temple to the deified Julius Cæsar was erected soon after by Augustus. On the N.W. side of the temple there are very distinct traces of a wall, segmental on plan, with the segment portion built into the podium of the temple which now covers and conceals it. Traces of the plinth and marble lining of the straight portion of the construction abutting N.W. on the Forum still remain; this is said to have been the Rostra Julia. From this rostra Julius Cæsar is said to have harangued the people, as well as from the platform of the adjoining Temple of Castor and Pollux; and here too it is said that Mark Antony addressed the people; and close by where the temple now stands the pyre was hastily constructed on which the body of Cæsar was burned. Here also Tiberius read his funeral speech on the death of Augustus.

I have endeavoured to note the position and present condition of these ruins which cover and surround the Forum, giving only so much description as seems necessary to identify them. Nothing is more striking, considering how large a portion Roman history fills in the history of the civilised world, than the small area within which the scenes of Roman history were enacted. The Forum of Rome was the focus of all, and the Forum of Rome is not actually larger than Lincoln's-in-fields. And the Via Sacra through which we are told the Emperors of Rome passed—followed by captive potentates—with the trophies of victory and long trains of armed warriors and slaves, and on their way to the Capitol, where the victorious Emperors proceeded

to solemnise their triumphs with religious rites—and the captive Kings were led to their prisons—and where the great annual religious processions of the people, carrying their images and their gods, passed on their way to the Palatine Hill—this great thoroughfare of Imperial Rome was only 12ft. wide.

DISCOVERIES AT ST. PAUL'S CATHEDRAL.

A PAPER describing the remains of Old St. Paul's Cathedral recently found has been read by Mr. F. C. Penrose, M.A., surveyor of St. Paul's Cathedral, before the Society of Antiquaries. The first portion of the lecture recapitulated what had been done in the south-west churchyard, and which the author laid before the Royal Institute of British Architects, January last, as noticed by us at the time.* The more recently discovered objects were then detailed. Mr. Penrose stated that firstly, the extreme north-west angle of the north transept had been found, which terminated with a flat pilaster in Portland stone, answering to one of that character at the south-west corner of the south transept, and which were obviously part of Inigo Jones's incrustations, as shown by Hollar. The next point was the search for Paul's Cross, and the remains of the east end of the old Cathedral, whilst the works for the conversion of the burial ground into a cemetery garden, by the joint arrangement of the Dean and Chapter and the Corporation of the City, were going on, and which offered an opportunity which was not to be lost. In the search for Paul's Cross the surveyor was aided chiefly by two documents; one a perspective view, preserved in the Pepsian collection at Magdalen College, Cambridge, which showed it from the east, and the other a plan which, although very inaccurate on some points, gave true representations of what had been found on others (the "Oxford plan, No. 2," as referred to in the paper read before the Institute). This latter being the only plan upon which the cross was shown was the principal guide. All other representations besides the two above mentioned appeared of less value.

The search was successful, although as it turned out, it was rendered precarious by the misleading directions of the plan named the "Oxford plan, No. 1," in the paper already referred to, which showed the lines of the old cathedral at the east end about 30ft. further north than they were at last found to be. "Paul's Cross" consisted of an octagonal wooden erection, probably about 17ft. from side to side, forming a pulpit, raised upon an octagonal platform 37ft. from side to side, or 40ft. from angle to angle. The lower courses of about half of the wall supporting this outer octagon was found, with the springing of a pointed brick arch, which carried the pavement of the platform, and a small part of the substruction of the central pulpit. The other half had been destroyed in preparing the foundations of the present cathedral, and the remains at the north-east corner were peculiarly deep. The site as discovered was much nearer the cathedral than general opinion had placed it. For instance, in the Ordnance Survey map, in forming which very great pains had been taken in investigating the documentary evidence available, the site is shown 70 or 80ft. distant. The foundations discovered were no doubt those of the restored cross, built by Bishop Kemp, about 1470 A.D., and which had played an important part during the time of the Reformation. The sermons there preached had in fact performed the duty now undertaken by the public press, of informing people's minds, by the authority of those who for the time being were in the ascendant, of the various phases of that conflict. Latimer and Ridley on the one side, and Fisher and no doubt Bonner on the other side, besides others, preached for and against the Reformation. The last occasion on which it is heard of, is that the Puritans of the Commonwealth ordered it to be levelled with the ground in 1642.

After the discovery of Paul's Cross, search was made for such remains of the east walls or buttresses of the old cathedral as might possibly be remaining under the churchyard wall, and part of a buttress was soon found, but owing to the misleading indications of the plan already re-

* See BUILDING NEWS, for Jan. 31st (p. 132), and Feb. 14th (p. 183); also article on "Improvements at St. Paul's," in issue for May 9th (p. 501) ante.

ferred to, in reliance upon which in the paper read before the Architects' Institute, it was argued that the axis of the old choir must have been deflected from that of the nave, it was difficult to assign to which part of the east end this buttress and some other parts of this wall foundations really belonged. At last, however, a portion of a buttress close under the present apse, where any remains were hardly to be hoped for, was discovered, and cleared up the question: proving that there was no deflection, but that the plan which had so distinctly represented the coincidence of the centres of the old and new cathedrals at the east end was in error by about 30ft.: the axis of the old cathedral being about that dimension to the south of the present. The plan referred to seemed entitled to more confidence, as it was found to be extremely accurate in all that respects the present cathedral and the form of the churchyard, but proved very inaccurate as respects Old St. Paul's. Search was now made for the inside of the south wall of the old cathedral, and was rewarded by the discovery of some fine shafts and bases of the chapel which was built as a crypt under the choir, when the cathedral was lengthened about the year 1260, and was called Jesus Chapel, and which subsequently became St. Faith's Church under St. Paul's, and also part of the pavement. The floor of this chapel is about 13ft. below the present ground, and must have been about 4ft. or 5ft. below the original read which passed between the cathedral and St. Paul's school. A discovery has also been made of the extension of the cathedral westward by means of an excavation which the Dean and Chapter have allowed to be made near Queen Anne's statue, and which shows the extreme length of the old cathedral (omitting the western portico added by Inigo Jones) to have been about 585ft. The extreme breadth at the transepts was 302ft. The axis of the present cathedral is to the north-east; that of the old was to the south-east. The point upon which they turn is exactly at, or very near, the centre of the dome. The angle between the axes is about 7°.

NOTES IN THE WEST.

TO-MORROW the foundation-stone of the new Eddystone Lighthouse, off Plymouth, will be laid by the Duke of Edinburgh, who holds the post of Elder Brother of the Corporation of the Trinity House. The cost of the new lighthouse will be £70,000. It is proposed to light the new beacon by electricity. It is now just 120 years since Smeaton's grand lighthouse was finished. This structure still stands boldly towering aloft; and it is the rock beneath, not the engineer's work, which has become unsafe. The ocean currents have changed their courses somewhat since Smeaton erected his beacon. Portions of the bases of old edifices, once dry and high out of water, are now covered, whilst other murens formerly, are now above water places covered by seaweeds. The pressure upon the building by the waves is computed to be three tons to the square foot.

The *Daily Telegraph* made a curious and characteristic blunder in a leader upon the Eddystone on Friday last. The writer laid stress upon the vast obligations which, all who, like himself, were familiar with the navigation of the English Channel, must have felt themselves under, for the lights that guide the mariner at every point, and then went on to inform his readers that the present Eddystone Lighthouse is built upon "the Bishop's Rock, and guards the shoals and breakers of the Scilly Islands"! And, as if to make this topographical discovery the more wonderful, the article refers to this Eddystone Lighthouse on the Bishop's Rock as "hurling back the waves in sight of Plymouth Hoe"! Considering that the Bishops' Rock and the Plymouth Hoe are more than 120 miles apart, this stretch of vision is remarkable.

A new church will probably be shortly built at Penzance, and another at East-the-Water, Bideford. In each instance it is most likely local architects will receive the commission.

Perhaps the most picturesque building in the whole of Great Britain is the seat of Sir J. St. Aubyn, Bart., M.P., upon St. Michael's Mount, situated in Mount's Bay, some quarter of a mile from the shore, where the pretty little village of Marazion stands:

"Majestic Michael rises; he whose brow
Is crowned with castles; and whose rocky sides
Are clad with dusky ivy!"

The restoration of the noble pile, situated upon the summit of the rock, has been in hand some six or seven years, from the designs and under the superintendence of the noble owner's near relative, Mr. James Piers St. Aubyn, architect, of Lamb Building, Temple, E.C. A perspective view of this building appeared in these pages some years since. The rock, which is composed of granite and slate, towers some three hundred feet above the level of the sea, and upon its rugged summit stands the mansion and church. The works have been carried out without the assistance of a contractor, under the trusty supervision of a clerk-of-works, and the additions are wholly in grey granite work. It is but due to add that the building exhibits some of the finest work in that material it has ever been man's privilege to see. The works are now drawing to a close, and it is expected that Sir John and his family will return to their romantic and beautiful home next month.

Another large building upon the same coast, now nearing completion, is Rousdon. But, whilst St. Michael's Mount is on the extreme western coast of Cornwall, Rousdon is on the eastern edge of the neighbouring county of Devon, just one hundred and thirty miles away as the seagull flies. But, while at St. Michael's the surroundings boast of all that Nature, in her brightest moments, can bestow, Rousdon has no such advantages, and is an artistic pile reared where tree almost refuses to grow, and where sea-fogs hide, for a greater part of the year, all that the skill of man has erected. Commenced in 1871, a series of illustrations in these pages (June 26, 1874, and again in May 12, 1876) gave a good idea of the work in progress. The architects for this important undertaking are Messrs. Ernest George and Peto, of 11, Argyll-street, London, W., and the mansion and its surroundings are being built, at a vast cost, for Sir Henry W. Peek, M.P. for Mid-Surrey. The group embraces the immense mansion itself, the church of St. Pancras, spacious schools, large stables and other outbuildings, three lodges, and a water-tower, the whole being erected in that artistic style of domestic architecture which is so essentially Mr. Ernest George's own. Mr. William Prosser, for very many years with the late Sir Gilbert G. Scott, is the very courteous and energetic clerk-of-works in charge of the job. It is hoped that the whole may be finished by the end of next year.

At Tresco, the second in size, and perhaps most picturesque, of all that community of one hundred and forty odd islands going to form the isolated Atlantic group known as the Scilly Isles, a new church has been built, at the cost of Mr. Dorrien Smith, the Lord of the Isles. It is just completed, and was consecrated by Dr. Benson, the Bishop of Truro, on Tuesday. Only six of the Scilly Isles are inhabited, and Tresco, upon which Mr. Smith himself lives, has a population of 266 souls, all told.

Stoke Gabriel Church, near Totnes, has been under restoration for some time under Messrs. Hayward and Son, of Exeter, and the work therein is nearly complete.

Pinhoe Church is being restored from the designs of Mr. R. Medley Fulford, of Exeter, and for Monkokehampton Church a handsome reredos is being made from designs by the same architect. This reredos is the gift of Sir Stafford H. Northcote, Bart., the Chancellor of the Exchequer, to whom the manor belongs. It is at present being carried out by Mr. Harry Hems, of Exeter. Mr. Edward Ashworth, also of Exeter, has the restoration of Shobrooke Church in hand, and additions to Silvertown Church are being made from the designs of the same gentleman.

Iddesleigh Church is being thoroughly restored, from the designs of Mr. Charles S. Adye, architect, of Bradford-on-Avon; and Petrockstow Church, having been for some time under restoration, under the superintendence of Mr. John F. Gould, of Barnstaple, is drawing near completion.

These last-named eight churches are all within a radius of twenty-five miles of Exeter.

In the ancient city itself, Mr. Butterfield's new schools at Mount Radford are beginning to get above ground. Messrs. Stephens and Bastow, of Bristol, are the builders, Mr. Newcombe the clerk of works, and Mr. Hampton the foreman. The huge new railway hotel, just opposite the South Western Company's station, is complete and open. It is a great building, designed by Mr. C. Ware, a surveyor, of Exeter.

Unfortunately, by a curious oversight, it has been built upon an angle some yards out of the square with the rest of the street wherein it stands (Queen-street, a long, straight, and noble thoroughfare), and the ill effect produced by this blunder may be better imagined than described.

In a recent number (March 28, 1879) Mr. Harry Hems described some very interesting old houses in Exeter, built upon the ancient bridge over the Exe. A dreadful case of child-murder and mutilation in that city has just occurred, thrilling the country with horror. The remains of the unfortunate child in question were first discovered in the water beneath these very houses.

It is being proposed that a new church be built at Newport, a suburb of Barnstaple. Messrs. Gould and Son, the well-known church architects, of the latter town, were commissioned to prepare plans for the same, and very satisfactory these drawings proved to be. Mr. Abbott, however, formerly partner in the firm of Messrs. Flockton and Abbott (now Flockton and Gibbs), architects, of St. James-row, Sheffield, has recently come to reside at Barnstaple, and has just given plans for the proposed church gratuitously, and a gift of fifty pounds into the bargain! It is said there is no comparison between the merits of the two designs, but, under the circumstances, art and filthy lucre are at rivalry, the one with the other, and the building committee are at a loss upon whom to bestow the apple.

Some curious houses, supposed locally to be of the Queen Anne type, are being erected near to where this proposed church will stand. They are built of red bricks, or tiles, in courses of 3in. by 6in. deep respectively, and at the angles of the bay windows, &c., these tiles are mitred! Mr. Alexander Lander, of Barnstaple, is the architect for these buildings. The tiles and bricks used in the fronts are also supplied by him, Mr. Lander being the principal of extensive potteries, as well as carrying on the business of a manure merchant.

ARCHITECTURAL ASSOCIATION.

WE give this week, in continuation from last issue, p. 658, the second portion of Mr. H. W. Pratt's paper, together with the subsequent proceedings, at the closing meeting of this Association held a fortnight since.

And now let us briefly glance at the arrangement of the French churches. With a few notable exceptions, we shall find them following one main type—viz., the Latin cross, and an apsidal choir. This comparatively simple plan has its varieties—e.g., the choir aisles are frequently double, and sometimes the nave aisles; and not only do radiating chapels form a feature of the choir alone, but continuous lateral chapels often line the nave. Hence we have a grandly-developed plan, as at Notre Dame, Paris, and the cathedrals of Bourges, Coutances, Rouen, and Tours; or without nave chapels, as at Amiens and Chartres Cathedrals, and St. Sernin, Toulouse, the last-named being further developed by the addition of an aisle round three sides of each transept. At St. Nazaire, Carcassonne, we have a line of eastern chapels, such as one sees in certain churches at Verona, Venice, and Florence. There are three on either side of the choir, and these were added to the transepts in the 14th century; they are separated from each other by open-tracery divisions, and produce an unusually beautiful east end. At Bourges and Mantua Cathedrals, and a few other churches, there are no transepts, while Angers and Vannes Cathedrals, and some other examples, have no aisles. Dol Cathedral is noteworthy as possessing a square east end, while the Cathedrals of Lyons and Vienne have an east apse, but the aisles terminate square. Another feature of considerable importance and much effect is the adoption of a lantern at the crossing. This feature is circular at the Abbaye aux Hommes, Caen; and at Lisieux it is square; but in others it is octagonal. Of the churches which depart from this general French type first and foremost is that of St. Front, Perigueux, said to be a copy of St. Mark's, Venice, and built by the same architect, the plan being that of the Greek cross surmounted by five cupolas. At the west end are the remains of an earlier church, over which stands a lofty and picturesque tower. The principal entrance is by the north transept, which is preceded by an open arcaded narthex. Each transept has a small apsidal chapel. The east arm of cross used to terminate in a 14th century apse, but there is now a new apse in the

style of the original church, but much more elaborate and not very satisfactory. The lecturer expressed great regret at the wholesale restoration which is now being carried out here, by which an ancient and most beautiful church has been transformed into a brand-new edifice. Perigueux has another domical church, formerly the Cathedral, and now called l'Eglise de la Cité. Only two compartments remain, and these are of considerable span, about 50ft., each surmounted by a cupola. As in St. Front, the supporting arches are pointed to a minute but discernible extent, and herein lies a distinction between these and St. Mark's, the arches of the latter being round. Probably when this church was complete it was similar to Cahors Cathedral, which has two demical compartments of about the same span and an apsidal choir with three apsidal chapels, the supporting arches again being pointed. Le Puy Cathedral has a nave divided into six compartments, each surmounted by an octagonal cupola. There are aisles and transepts, the latter divided in a peculiar fashion into two parts by a pair of columns supporting a groined soffited gallery. The choir has now a square end, but this has been rebuilt for increase of accommodation. At the crossing is a domed octagonal lantern rising out of a circular cupola. Owing to the steep slope on which the church is built, the entrance has been contrived rather ingeniously. It is approached by a steep street, ending in a long flight of steps, at the top of which are three lofty arches. Passing through these, you still ascend steps along a stepped vaulted corridor under the nave. At the end of this corridor is a wide doorway, which opens upon a flight of steps left and right, the former leading to the cloister and the latter to the church, which is eventually entered in the south aisle. It is supposed, however, that the original intention was to pass under the whole length of the nave and enter the church in front of the altar; it is quite possible that such an entrance once existed, and that the present is a subsequent alteration. Fontevault Abbey Church is not unlike Angoulême; it has a choir aisle and three instead of four chapels to apse, but, sad to say, the abbey buildings now form an extensive prison! The nave of the church has had upper floors inserted to make dormitories for the prisoners, the ground floor being their refectory, while the transepts and choir remain for the chapel, and in a corner of the south transept are placed the recumbent figures of Henry II. of England and his queen, Richard I., and the widow of King John, but their bones have long since been seized and scattered. St. Ours, at Loches, is certainly a unique church. It is of 12th century date, and consists of a nave in two compartments, each of which is covered with a lofty octagonal conical cupola open up to the top, and perfectly plain. At the crossing is a tower, which forms an octagonal cupola with a circular light at the apex; there are transepts with apsidal chapels, and a small apsidal choir. At the west end is another tower, and west of this a large square narthex, with fine Romanesque doorways. The exterior is rendered singular by the two lofty pyramids between the east and west towers, though, taken in conjunction with the buildings surrounding the castle heights it is picturesque and striking. Neither in France nor Italy do we see the beautiful cloisters with which we are so familiar in this country, but there are several interesting examples. They uniformly possess arcades of small arches mostly springing from double shafts, and though we miss the tracery we have instead finely sculptured capitals. On the north side of the Abbey Church of St. Pierre, Moissac, near Toulouse, is a beautiful 12th century cloister, one of the piers bearing the date 1110. The arches are moulded and pointed and spring alternately from single and double shafts; at each angle and in the centre is a square sculptured pier. All the capitals are beautifully sculptured with Scriptural subjects, and have explanatory inscriptions attached. This is one of the most remarkable cloisters on the Continent, and, wonderful to say, is in excellent condition, and without sign of restoration. He understood that a young English architect had made elaborate drawings of this abbey, but could not ascertain his name. The author also described in detail the cloisters at Le Puy Cathedral, San Zenone, Verona, Montmajor Abbey, Mont S. Michel, San Matteo, Genoa, the Campo Santo at Pisa, and at the disused church of San Gregorio,

Venice, and proceeded to notice the church towers of Italy and France. In the former country the oldest form is the round tower, but the characteristic form is the campanile. In the North of Italy the campaniles, although not possessing any great variety, are as a rule of good proportion and bold in treatment, and show what may be done without the use of the buttress. In France we find the type of tower and spire with which we are not unfamiliar in this country. One of the best managed features of the French spires is the treatment of the broach and pinnacles. The low square tower with which we in this country are acquainted, does not seem to find a place in Italy or France. He could but just allude to the charming colour decoration, which adorns so many Italian churches, and to the use for these purposes of such a durable material as the mosaics, which have for so many centuries withstood the ravages of time, and remain to-day the most beautiful specimens of permanent decoration which it is possible to employ. In conclusion, Mr. Pratt said: One cannot return from scenes so delightful and work so interesting, without having gathered some lessons. From Italian brickwork we have especially much to learn: some of its detail is most exquisite, and it seems surprising that our own great brick country should attempt comparatively so little out of the ordinary way. That we cannot adopt the use of marble is perhaps an advantage; for the many systems of incrustation, which such a valuable material necessitates, would introduce a kind of construction not to be commended. In many respects the Italian work displays a simplicity of parts, and consequent largeness of scale, which detracts from its excellence. Their groined buildings bear no comparison with those of England and France, and their carving is disappointing. I refer particularly to capitals, and it seems strange that in a country noted for its figure sculpture, and where the column is so largely employed, we should see such poverty of treatment. Another Italian feature which is not satisfactory is the favourite adoption of a front or façade instead of a good all-round exterior. We see plenty of this in our modern work at home, but no one except the stingy client upholds the shabby-back style. In our churches we pay perhaps more attention to the exterior; the Italian usually reverses the order, and in this each has something to learn from the other. One might easily prolong comparisons, for a tour on the Continent opens one's eyes to varieties, defects, and beauties in different countries. May we profit by international intercourse, for while it will tend to develop our minds and will influence our lives, it will be the means of promoting the happiness and well-being of our fellow-men.

Mr. R. P. SPIERS suggested that it was scarcely prudent for Mr. Pratt to have endeavoured to describe a tour of eight months' duration in an hour's lecture; it was probable that he had materials for a second and more detailed lecture on some portion of his travels. In examining the domes of St. Front, at Perigueux, it was clear that it followed the general proportions of St. Mark's, Venice, but the construction was more clumsy and based on a different treatment of the vaults, the pendentives forming a kind of web. The restoration of this church had been unfortunately carried out, for it had completely blotted out one of the most important features of its history. Originally the arches in the nave of St. Front were scarcely perceptibly pointed; and M. Abadie, the architect who had restored it, had conceived the idea of making all the arches semi-circular; so he had the arcades carefully rebuilt in that manner, thus destroying their true character. The Abbey at Moissac was carefully measured and drawn during 1874-5 by Mr. Drinkwater, who was employed in Mr. Street's office. He would propose a vote of thanks to Mr. Pratt for his paper.

Mr. HUGH STANNUS, in seconding the motion, illustrated on the blackboard some of the subtle refinements in the planning, vaulting, and lighting of Italian churches, which appeared to have escaped Mr. Pratt's attention. He suggested that the lecture would have been valuable had it dealt with a few points in greater detail.

Mr. S. F. CLARKSON remarked that he was present at the International Congress of Architects, at Paris, last year, when M. Abadie was taken to task for his work of destructive restoration at Perigueux. He pleaded that when he

was called in, St. Front was so near absolute ruin that it became a question whether it should be maintained or not. He decided to repair rather than rebuild, and considered he was justified in restoring it to what he supposed was its original condition.

Mr. E. B. P'ANSON thought the extreme ingenuity displayed in the planning of Venetian churches would repay the study of those who might have to build in London streets or other confined spaces. Frequently, by a mere parallelogram they were skilfully broken up into aisles, chapels, and transepts, so as to produce the impression of considerable complexity and size. The brickwork of North Italy was the finest in the world, and while our treatment of brick was improving it would be better for students to broadly examine the mode in which it was used there than to take little bits cribbed from Walthamstowe, Stoke Newington, and Clapham, and endeavour from these to produce Queen Anne work.

Mr. BLASHILL urged upon young members not to confine their studies to England, but to take the first opportunity that availed of seeing how things architectural are managed on the Continent.

The vote of thanks having been carried, it was briefly responded to by Mr. Pratt.

ELECTION OF OFFICERS.

The scrutineers, Messrs. Farrow and Cresswell, announced that the following officers had been elected to serve during the session 1879-80:—President: S. Flint Clarkson. Vice-presidents: E. G. Hayes and R. E. Pownall. Members of Committee: A. Payne, W. H. Nash, E. B. P'Anson, T. E. Colclutt, J. Neale, A. Conder, G. R. Redgrave, E. E. Deane, H. L. Florence, and W. Penstone. Treasurer: J. Douglass Mathews. Librarian: H. W. Pratt. Secretaries: R. C. Page and F. Eales. Solicitor: Francis Truefitt. Assistant-librarians: J. W. Stone and F. Hemmings. Auditors: T. E. Mundy and W. Crisp. Registrar: Thomas H. Watson.

Mr. SPIERS proposed a vote of thanks to the President for his conduct in the chair during the session. Mr. Florence had been most regular in attendance at sessional meetings, and on committees had been assiduous in promoting the interests and prestige of the Association, and had upheld the position of president in the manner in which they all expected he would do so.

The motion was seconded by Mr. Blashill in complimentary terms, carried amidst applause, and suitably acknowledged by Mr. Florence.

THE YORKSHIRE FINE ART AND INDUSTRIAL EXHIBITION.

STAINED and painted glass is here of all descriptions—ecclesiastical, municipal, and domestic, Mediaeval and Renaissance, pictorial and conventional, quiet and glaring. The exhibitors are Messrs. Adam and Small, Glasgow; Campbell and Smith, London; Camm Bros., Birmingham; Dixon and Vasey, London; Gibbs and Howard, London; A. Hodgson, York; J. W. Knowles, York; Knowles and Co., London; Powell Bros., Leeds; Shrigley and Hunt, Lancaster; and Thomson and Co., Leeds. Powell Bros. occupy one of the positions above the refreshment bars. One light is fitted with a rather powerfully drawn figure of St. Dominic, in brown coat; simplicity of colour and outline has been aimed at with good result. The next light illustrates the Crucifixion, and is a portion of the east window of Nether-hoy Church. The third is less ecclesiastical, and illustrates the game of football. All three lights have grounds of white and yellow, the primary colours are well subdued, and the general effect is good. Messrs. Shrigley and Hunt have but one specimen of their art, Renaissance in style, illustrative of the Arts, with figures of Michael Angelo, Giorgione, Raphael, and Titian, with smaller figures above representing Poetry, Painting, and Sculpture, and one below, Music. The whole is pleasing in composition and colour. Next to this is a window by Messrs. Knowles and Co., of composite character, the various portions not only lacking unity in design, but being of various periods of Gothic art. The subjects are Christ Sitting in Glory, the Virgin and Child, St. Catherine of Alexandria, St. John the Evangelist, &c. Apparently they are not intended for one window. The exhibits of Messrs. Adam and Small are rather numerous, and are scattered

about different parts of the building. Under the north gallery are two lights, the one containing the figures of Eli and Samuel, the other Timothy and his Mother. These are excellently drawn and richly coloured, but the contrasts of colour are too marked. The draperies are very dark, inclining to opacity, while the heads and hands seem washed out in comparison. Still these windows bear a good deal of looking at, which is more than can be said of others very near them. By the north-west staircase the same firm has a pointed light, treated in less conventional manner, illustrating the text, "Praise the Lord, O my soul." A female stands in a posture of reverent attention, in front of her being a child, who looks up admiringly into her face. The plants in the background are rather coarse, but the whole is very pleasing, and rich in colour. There are several panels for domestic use in staircase and library windows, &c. One is composed of small squares of coarse glass, with a few of wavy glass at regular intervals, inclosed in a frame of Jacobean character, with rather absurd architectural details at top and bottom. There are other panels in English Renaissance, with stained and painted glass mixed. The exhibits of Messrs. Campbell and Smith are of domestic character, and are mostly panels for insertion in large light openings. "Autumn," "Morning," "Vivien and Merlin," "The Crow and the Pitcher," &c., form the subjects of these designs. Some of them seem too conventional. Messrs. Camm Bros. send a variety of work. One window tells the story of the Ten Virgins, the centre light being occupied by a figure of the Saviour regally attired. Another window is intended for a boudoir, and has small painted panels illustrating the "Midsummer Night's Dream." It is placed too high to be properly inspected. On the south-west stairs is another work of Messrs. Campbell and Smith. It is a panel with a scene from Moliere's "Bourgeois Gentilhomme," and shows how a subject may be freely treated and yet lend itself to the lines of the lead glazing, which hardly interfere with the effect, although the scale of the drawing is small. The colours are quiet and yet rich.

Messrs. Gibbs and Howard are represented by three windows, of which the largest is in a rococo Renaissance style—that is, the architectural details partake of that character. The central subject, "The Expulsion of the Moneychangers from the Temple," is vigorously treated. The flesh tints are browner than is usual in stained glass, and the modelling of the features, &c., better. Another light gives a picture of St. Balba, with an architectural model in her hand, under an elaborate Late Gothic canopy. The third exhibit shows Othello relating the story of his life, in which the artist has hardly done justice to Desdemona. The exhibits of Messrs. Thomason and Co. are all pleasing in tone, but there should be a little more variety about flesh tints when they are in immediate juxtaposition with white draperies. Messrs. Dixon have a window of two lights of very peculiar appearance, all the glass usually white having a dirty greenish tinge, while some of the draperies are very dark. The subject is the "Adoration of the Magi." The drawing is good, and the forms are well defined. Elsewhere this firm has three lights for a Tudor window, "St. Cecilia," with an angel on each side. There are some faults of drawing, as, e.g., the hands are rather small; but the arrangements of colours are pleasing. A panel for a staircase window has some forcible drawing and rich colour in a branch of some tree in blossom, with a ruby-coloured bird on the wing. In a circular panel representing the Entombment the colours are very dark, inclining to black. Altogether there is a very complete collection of stained and painted glass in this exhibition. It seems a pity that it could not have been kept more together, and, in several instances, nearer the eye of the observer.

C. P. E.

PRESERVED AND UNPRESERVED TIMBER.

THERE appears to be a general consensus of professional opinion as to the value of the preservation of timber for structural purposes, though a few architects and engineers are to be found who look upon all processes with distrust, and who, upon plausible grounds and with well-meaning intentions, declare certain processes to be useless or destructive under certain conditions. We are not about to discuss this general ques-

tion, which will be found to be a much narrower one when stripped of all ambiguities of meaning, and when that rock to all disputants, "seasoning," is disposed of; nor need we enter into the numerous processes that have been suggested, all pretty well known to our practical readers. We may confine the attention to one process, which all have agreed to accept as the most economical, namely, creosoting, while we refer to some information compiled by Mr. John Bogart, a member of the American Society of Civil Engineers, and published in a tabulated form in the January number of that Society's *Journal*. It will be admitted that no experience with respect to timber has been so great as that in connection with railways. Our permanent ways have given opportunities in the testing of timber and iron for a series of years not found elsewhere, and in no condition is timber more exposed to decay, or placed under more trying circumstances, than when it is laid as railroad sleepers, sometimes underground and at other times half-exposed to atmospheric influences. Accordingly, we find that railway engineers have devoted considerable attention to the preservation from decay of so important an item in the maintenance of railroads, and that for some years past the greatest care has been bestowed in collecting statistics. Mr. John Bogart, in his elaborate paper on the "Permanent Way of Railways in Great Britain, with especial reference to the Use of Timber Preserved and Unpreserved," has taken the trouble of collecting answers to a series of questions he circulated among the leading engineers of railways in Great Britain and Ireland. These he has given in a summarised form, and they are so valuable in their bearing upon the subject that we may briefly make a few remarks upon them. We find that the bulk of the sleepers used in English and Scotch railways are of Baltic red wood, generally about 9ft. long, 16in. by 5in. in section. All the railway officials who have given answers, with one exception, record the process of creosoting as the method that has proved the most efficacious. Among the names of engineers who have supplied information, we find Mr. R. Johnson, of the Great Northern; Mr. E. H. Lloyd, of the Great Western; Mr. Alfred A. Langley, of the Great Eastern; Mr. W. Jacob, of the London and South Western; Mr. H. Johnston, of the Midland, and several others. The process is the only one now in general use, and the amount of creosote oil forced into the wood averages 0.82 gallons per cubic foot, or the weight of oil forced in averages about 7.175lb. per cubic foot. In many cases the work is done by contract, in others the company has its own creosoting works. The cost averages about 10d. a sleeper. As regards the average life of preserved sleepers, the answers are very various. Some give it as 10 years, others 20, but taking all the replies, 16 years seems to be the general average, while the actual gain by the process is stated to be from two to ten years. In reply to the question whether preserved sleepers hold the spike better than unpreserved ones, the majority of answers goes to show that they do; though, as far as compressibility is concerned, the experience of many is, that creosoting does not harden the wood so much as to prevent the chair cutting under heavy traffic. The writer mentions several samples of sleepers taken from roadways which are in an excellent state of preservation after a service of 10 to 22 years. We have already quoted the experience obtained by the officials of the North-Eastern Railway, and another sample of a creosoted Scotch fir sleeper taken promiscuously out of the main line near Tweedmouth, having been in use 20 years, is mentioned in such a good condition that the engineer, Mr. Harrison, considers it to be likely to wear another 10 years, though it has been run over during that period by all passenger and goods trains between London and Edinburgh.

Mr. Bogart's researches and summarised results prove the value of creosote oil as a preservative in railway works, and we consider the experiment one well worth the attention of engineers and architects. If one of the professional institutions would commence a series of tests with the object of showing the value of preservative processes, beginning with paint, and applying the other chief processes to timbers placed in various positions, and recording the condition of each specimen after a given interval, something like certainty would be attained. Timber piles exposed to the joint influence of water and air, posts for fencing, and pillars

standing above ground, are three cases whose conditions are somewhat different; these should be all tried. Timbers in exposed positions laid horizontally, weather boarding, rafters, and joists, should be tested in several different circumstances, both as regards exposure and the seasoning of the timber. It would be well if each institution had a record office to which particulars and statistics of this sort could be forwarded, so that the results may be classified and compared for practical reference.

PARLIAMENTARY NOTES.

ARTISANS' DWELLINGS IN PRIVATE BURYING GROUNDS.—Mr. Waddy read a statement in the House of Commons on Thursday week relative to excavations which had been made in a private burying-ground, as he understood, in Islington, which had been utilised as a site for artisans' houses, under the Act of 1868. After digging for not more than a foot in depth the workmen came upon a mass of human bones and black slush. To enable them to continue their operations they were supplied with stimulants, but no sufficient foundation could be prepared for the building. The ground was loaded with human remains and dangerous to the public health. He wished to know whether anything could be done to prevent houses being erected in such a locality, and if erected, to prevent them being occupied.—Mr. Cross was anxious to have made an order to close the place and cover it up; but he found on inquiry it would be impossible to do so. The same thing had been attempted by his predecessor Sir George Grey, but he had no power to interfere. Perhaps the best remedy in such a case would be to indict the owner of the private burial-ground or the builders for a nuisance. He had ordered a special report to be made to him. He could not conceive anything more injurious or more scandalous.

THE WEAVERS TOWER AT NEWCASTLE.—Mr. Percy Wyndham, on Tuesday, asked the Secretary to the Treasury whether, in the matter of the threatened destruction of the Weavers Tower at Newcastle, the Lords of the Treasury had stated their opinion that its destruction ought not to occur except upon the decision of a clear majority of the whole number of the council; whether he was aware that the motion for its destruction had been carried by a majority of one of the whole number of the council; and whether in the circumstances the Lords of the Treasury would not again interfere. Sir H. Selwin-Ibbetson said,—The Lords of the Treasury did express an opinion that the destruction of the building should not occur except upon the decision of a clear majority of the whole number of the Town Council. I am informed by the Town Clerk that the council when fully constituted consists of 64 members. When the discussion was held about the Weavers Tower there were two vacancies, reducing the numbers to 62. Of these 48 were present at the meeting, 32 voted for the destruction, 6 against, and 10 declined to vote. The Treasury has no power to interfere further in the matter, as it has already signified its assent to the scheme for the free library subject to a recommendation that the question of preserving the tower should be decided only by a clear majority of the council. As only 6 members out of 62 were found to vote for the preservation the division must be regarded as a decisive expression of local opinion, and I believe I may say that the principal opponent expressed himself satisfied with the decision come to at the last meeting.

At the half-yearly meeting of the proprietors of the Bank of Ireland Stock, held in the old House of Lords, Dublin, on Friday, the chairman called attention to the fact that the room has been newly painted, decorated, and furnished, and the historical tapestries have been restored to a proper condition. These tapestries were made in the liberties of Dublin in the year 1732 by John Van Beaver, a Huguenot refugee, and bear his signature and the date. In the following year they were hung in the place they now occupy. Being in a very dilapidated state, and almost falling to pieces, they were recently sent for repair to the Royal Tapestry Works at Windsor, where the restorations have been carefully effected.

The local board of Torquay have instructed their surveyor to prepare plans for a fever hospital, the cost of which is not to exceed £2,000. They have also decided to make the town supply of water constant instead of intermittent, as hitherto.

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ILLUSTRATIONS.

NEW PREMISES IN WATLING-STREET.—NEW PREMISES IN ROOD-LANE.—HOUSE AT DIDSBUY.—DESIGNS FOR LYCH GATE, ST. PETER'S, CARMARTHEN.—DESIGN FOR A VILLAGE SCHOOL CHAPEL.—ARCHITECTURAL MUSEUM SKETCHES.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NEW BUSINESS PREMISES IN THE CITY.

A DOUBLE-PAGE illustration shows perspectives of new premises at the junction of Watling and Broad-streets (on the site till recently occupied by the Church of All Hallows, in which John Milton was baptised), and in Rood-lane. They have been recently erected, from the designs of Mr. Alexander Peebles, F.R.I.B.A., of Salter's-hall-court, Cannon-street, E.C.

HOUSE AND STABLES AT DIDSBUY, NEAR MANCHESTER.

THE view we give of this house is of the front facing the Mersey-road, the principal elevation being towards the gardens. The whole of the external walls from the ground-floor line are to be covered with Portland cement, finished with silicate distemper a toned white, the quoins, cornices, strings, chimneys, &c., being of bright red brick, and the roofs green slates of a small size. We give the ground-plan. On the first floor there are four large bedrooms, nursery, and bath-room, &c., and on the floor above the same number of bedrooms, all square to the ceiling, a servant's bath-room being provided off the half-landing of back-stairs. A range of conservatories will connect the house and stables, and a large brick wall, with close gateway, inclose the whole of this side of the site as shown in the view. Mr. Geo. Frooth Roper, of Haworth's-buildings, Manchester, is the architect.

LYCH GATE, CARMARTHEN.

AMONG our lithographic plates to-day we illustrate both the selected and second design for the lych gate which is about to be erected at St. Peter's Church, Carmarthen, in memory of the late vicar, the Rev. Latimer Maurice Jones. The designs were submitted in open competition last November, with about thirty others, and the selection was made upon the recommendation of the Bishop of St. David's. The author of the selected design is Mr. Francis E. Jones, architect, of 29, Cockspur-street, S.W., and the contractor for the work is Mr. Thomas David, builder, of St. Clear's, near Carmarthen. The

lych gate will be of Runcorn's stone throughout, the roof being of stone to give a monumental or a "memorial character" to the structure, as suggested in the instructions. The second design is the work of Mr. J. Martin Brooks, of Wellington-street, Strand, who has failed to send us any particulars of his plan. However, our readers may compare the two designs, and draw their own conclusions. Mr. Brooks' drawing is now on view at the Royal Academy's Exhibition.

ROYAL ARCHITECTURAL MUSEUM SKETCHING CLUB.—SKETCHES OF ORNAMENT FROM SALISBURY, &c.

THE lithographic illustration of ornamental detail which we publish to-day is from the full-size sketches by Mr. Pennington made at the Museum in March last. The enriched moulding is from the Audley Chapel, Salisbury Cathedral, and the beautifully-designed patera from a ceiling in a cast in the Museum bearing no date or name.

"BUILDING NEWS" DESIGNING CLUB. A VILLAGE SCHOOL-CHAPEL.

A VILLAGE SCHOOL-CHAPEL is one of the most ordinary as well as useful subjects, perhaps, that could have been chosen for the members of our Designing Club on which to exercise their ingenuity, and in consequence an unusually large number of designs were submitted. Several took rather the form of a cemetery chapel or country church, while others assumed more of the village mixed school character. Few designs combined the twofold requirements of a school-chapel, either in plan or architectural expression. "S in a circle," whose design we publish to-day, unquestionably worked out the problem with the most satisfactory results. His plan, upon which we have already remarked when reviewing the whole series, has many points of merit, especially in the double-porch or lobby, and in the separate chancel arrangement, without making the chancel too prominent or expensive a feature.

THE ARCHITECTURAL MUSEUM SKETCHING-CLUB AT STONE, KENT.

LAST Saturday several members of this sketching club joined the first out-door sketching excursion which has been held in connection with the museum, it being proposed to hold a short series of similar outings to places in the neighbourhood of London during the summer. Leaving Charing Cross by half-past two, the excursionists reached Stone Church, the building selected for the day's sketching, rather before four, the party numbering about a dozen members. A general survey of the church was made, and some brief particulars being given by the conductor of the party, Mr. Maurice B. Adams, after which sketches were made from various portions, and general views from almost every side, each individual simply following his own bent. Of course the interior is deservingly considered by far the most interesting portion of the church, though the building is exceedingly picturesque from the north-east, where the quaint though Late chapel of the Wylshyre family, now used as an organ-chamber, breaks up the composition with the flying buttress to the chancel wall over the embattled parapet of the chapel below, while the roof of the chancel, being higher than the nave, adds greatly to the effect. The church consists simply of a chancel and nave, with north and south aisles and western tower, the main entrance being from the north side through an elaborate and curiously enriched doorway, the mouldings of which are much dilapidated. The nave arcade is of three bays of thirteenth-century date, having beautifully foliated eaps, unsurpassed, perhaps, by any in the kingdom. The windows of the aisles are composed of two splayed equilateral lights with a quatrefoil spandrel; but the easternmost ones in either aisle seem to have been the only ones really completed in accordance with the original design, and these are exquisite in proportion, having a detached shaft and inner tracery head. The roof, which is modern, is of wood, and no traces of a groined roof remain. The chancel is enriched on all three sides by an elaborate wall arcade, the details of which are familiar to all English students of Gothic work, and perhaps no example has been more frequently measured and drawn. The windows of the chancel, as well as the groined roof, are restorations, or, at any rate, the groining may be so termed, though the insertion of the Geometrical windows appears

more questionable, not as to date, for they were inserted a few years ago by Mr. G. E. Street, when he repaired the church, but in design and fitness. Perpendicular windows existed before Mr. Street took the work in hand, and these have been removed to make way for the new ones of earlier design, the window on the south side being of the same size and detail as that in the east wall, so that when seen from the exterior the scale of the windows in the nave suffers seriously on this account. In 1778 the chancel is said to have been furnished with stalls of ancient date, however, these were removed before 1836. At present some ordinary seats are used. The benches in the nave are of deal, with ends well notched, arched, and chamfered. The pulpit, with the exception of the crowning cornice, is very poor both in execution and design. The windows at the east end of the aisles are of different design; that in the north aisle is by far the larger of the two, and is very handsome, though the window, as a whole, seems of an indifferent proportion. Mr. Street has carefully restored it, leaving the upper part open to the organ-chamber. The window in the south aisle east wall is more simple, though more in keeping with the side lights, and certainly of finer proportion than the larger window just named. The tower is later in style than the nave and lower portion, while it appears to be of a much meaner character than that originally intended, judging from the two flying buttresses in the aisles, springing from the wall at window-sill level to the top of the piers under the tower, as this precaution would, probably, not be necessary had so small a tower only have been proposed. The eaps of the tower piers are unsatisfactory in the abacus. The stair-turret is quaintly arranged, and the curious way in which the clock comes in the corner of the south side, over the turret, is characteristically picturesque. The windows of the vestibule at the west end of the aisle are of Decorated character of simple design, as is the west doorway. The church and churchyard are well kept, and Canon Murray is the rector. The dedication is to St. Mary, and the living is in the gift of the Bishop of Rochester. Walter de Morton, a bishop of that see, is supposed to have built the nave and chancel, commencing the work in about 1270. Mr. Street is of the opinion that the architect of the building was also the designer of Westminster Abbey. Daniel Dig, the first rector, was presented to the living in 1284, the 13th year of the reign of Edward the First, by the Bishop of Rochester. The living is said to be valued at £765 per annum.

CHIPS.

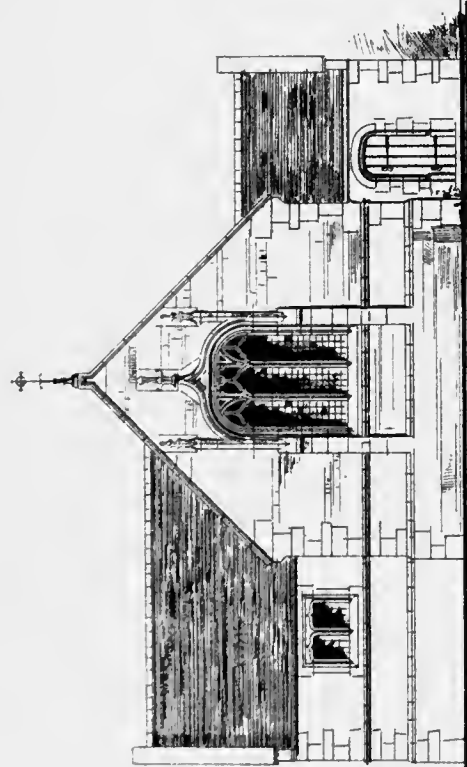
At a meeting of the Royal Dublin Society held on Monday evening Mr. G. H. Kinahan, M.R.I.A., read a paper on Arklow Harbour, the improvement of which was commenced in 1847. He stated that though the money expended on it, including £30,000 by the Wicklow Copper Mine Co., had given results far short of those anticipated, yet the port had been vastly improved; for while in old days it only admitted boats drawing from 3ft. to 4ft. of water, now most of the vessels that frequented it drew from 8ft. to 10ft., and even more. He made various suggestions for the further improvement of the harbour. In the course of the subsequent discussion, it was stated that the Wicklow Copper Mine Co. are expending £40 a week on the improvement of the harbour.

An additional supply of water from Moorfoots for Edinburgh was turned on by the Lord Provost on Friday. The works are so far completed as to supply 4,000,000 gallons of water daily, but when finished the total daily water supply will be double that given hitherto.

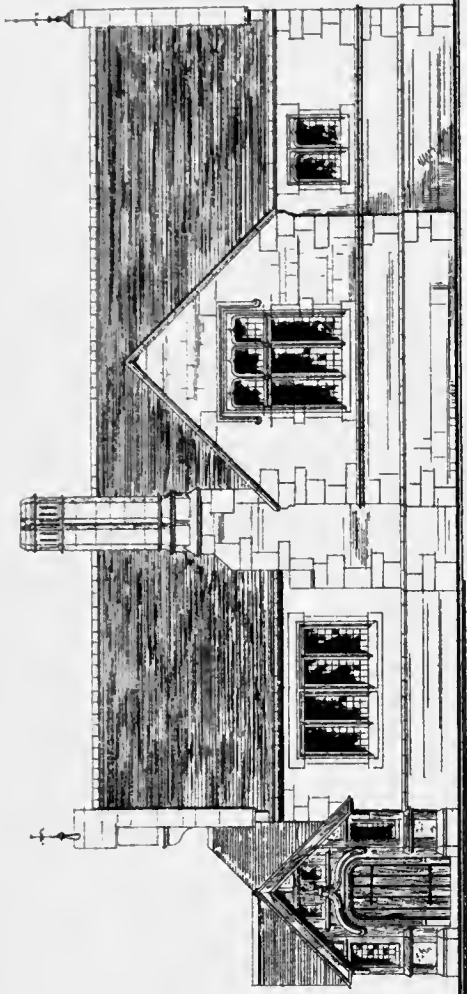
On Sunday week All Saints' Roman Catholic Church at Sedgley was reopened after alteration. The building has been repewed and refloored and decorated in colour at a cost of £200. The work has been carried out by Mr. Hilton, builder, and Mr. Eggington, painter, of Sedgley.

Mr. Folingsby, an Englishman who has resided for many years at Munich, has been appointed director of the Melbourne Art Academy.

The Lords Commissioners of the Admiralty have accepted the tender of Mr. J. G. Naylar, of Rochester, amounting to £3,443, for the erection of new schools, with teacher's residence, for the education of the children of the Royal Marines who may be stationed in the Chatham district. The foundations of the buildings have already been put in by the Admiralty, who also supply bricks and stonework for the building, bringing the total cost to upwards of £5,000.



East Elevation

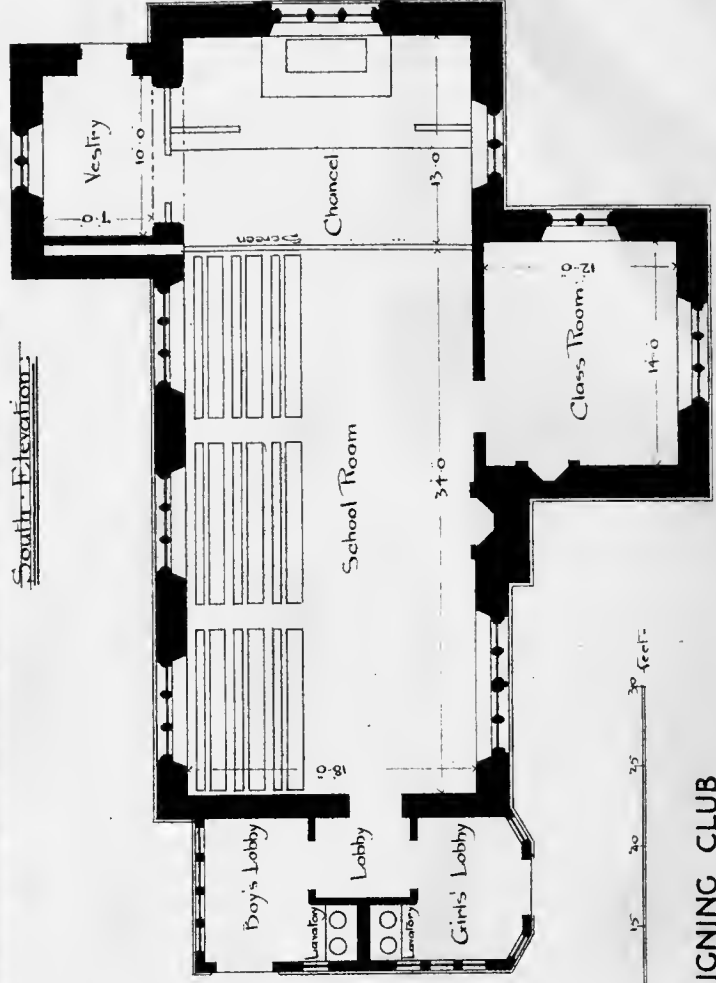


South Elevation

Building News Designing Club
A Village School Chapel



View

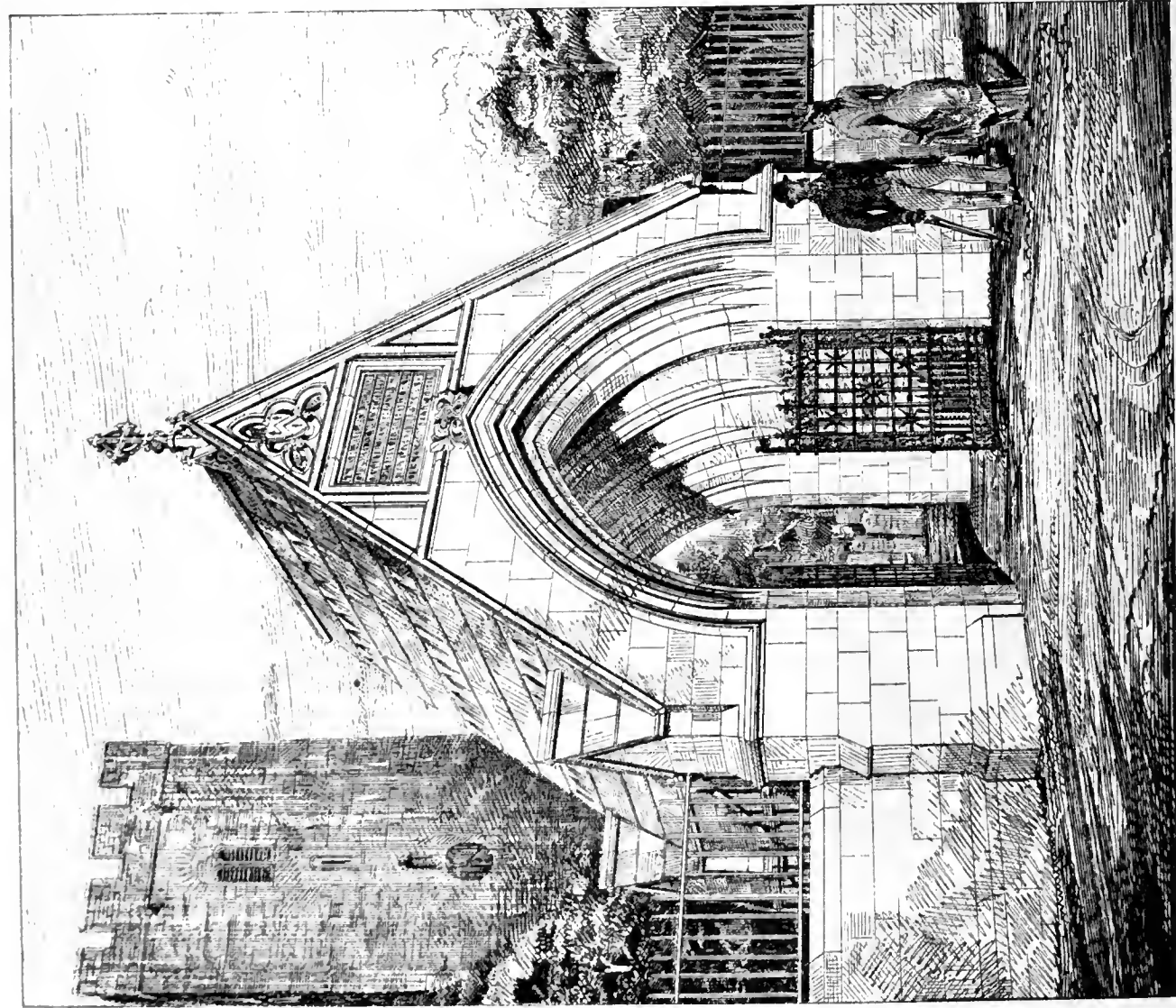


Plan

SELECTED DESIGN

Scale 1 2 3 4 5 6 7 8 9 10 15 20 25 30 feet

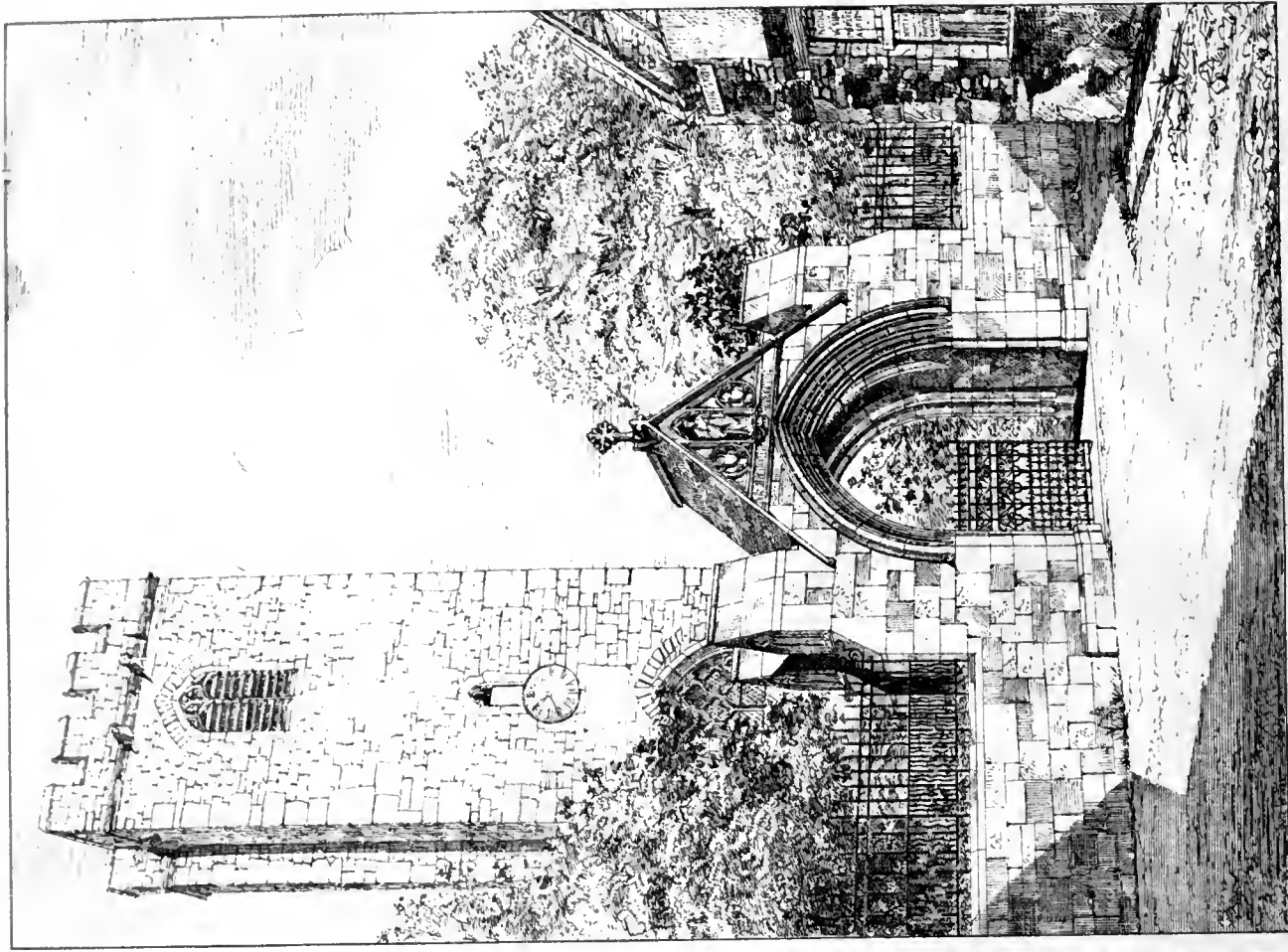
"BUILDING NEWS" DESIGNING CLUB



Francis & Jones, Architects

ACCEPTED DESIGN

Lych Gate: St. Peter's Church, Carmarthen, in Memory of R. L. M. Jones:



DESIGN PLACED SECOND

J. M. BROOKS ARCHT

THE BUILDING PEWS, JUN. 20 1879

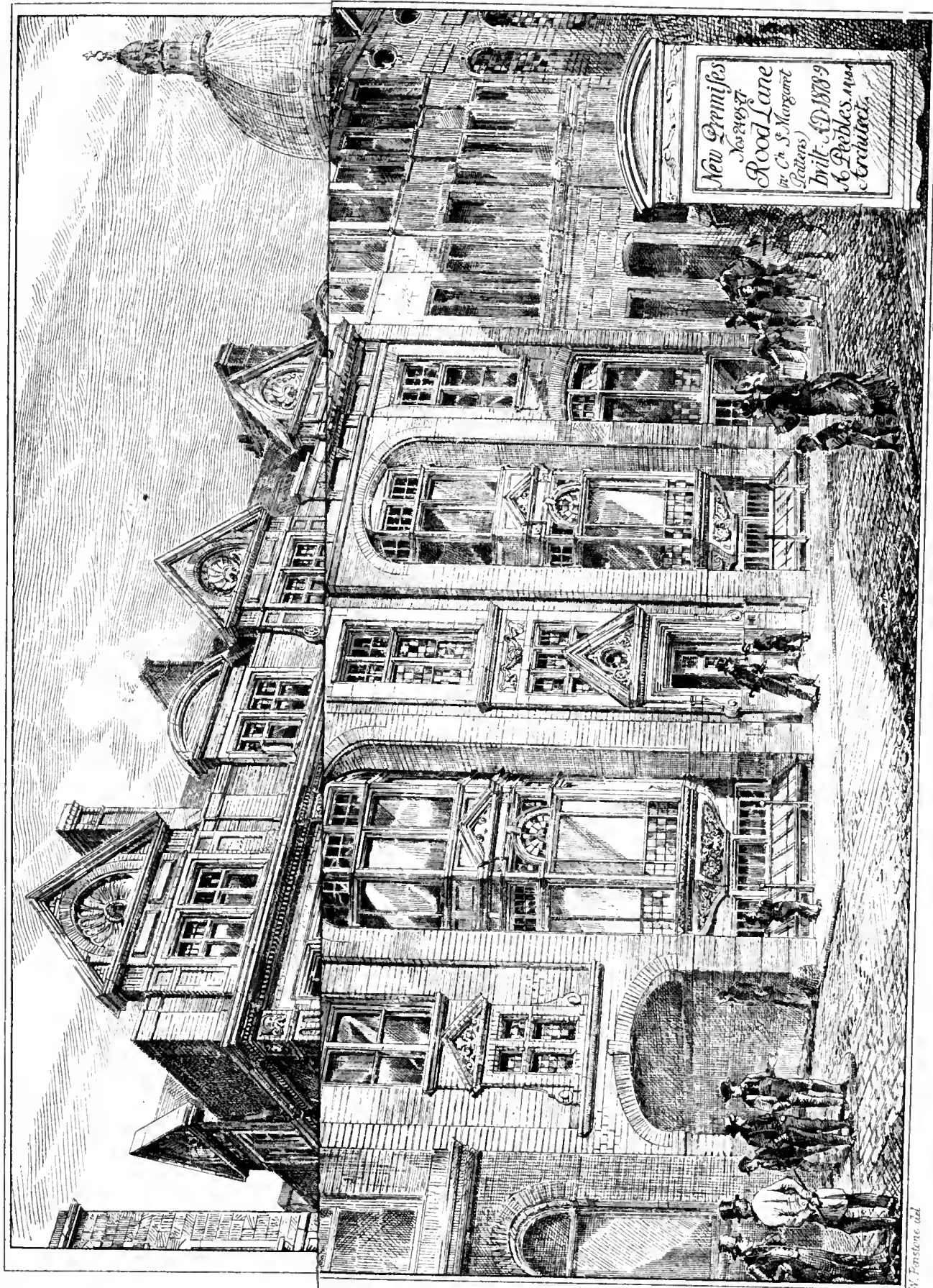
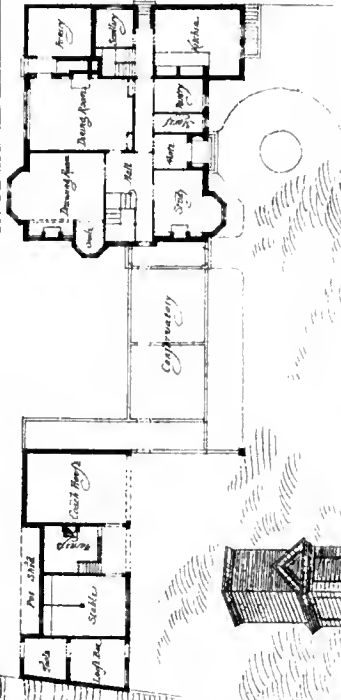


Photo Lithographed & Printed by James Alliman, 6, Queen Square, W.C.

W. Fensholt del.

Horse and Stables Didsbury
near Manchester. GEO. FREETH ROYAL ARCHT



Ground Plan.

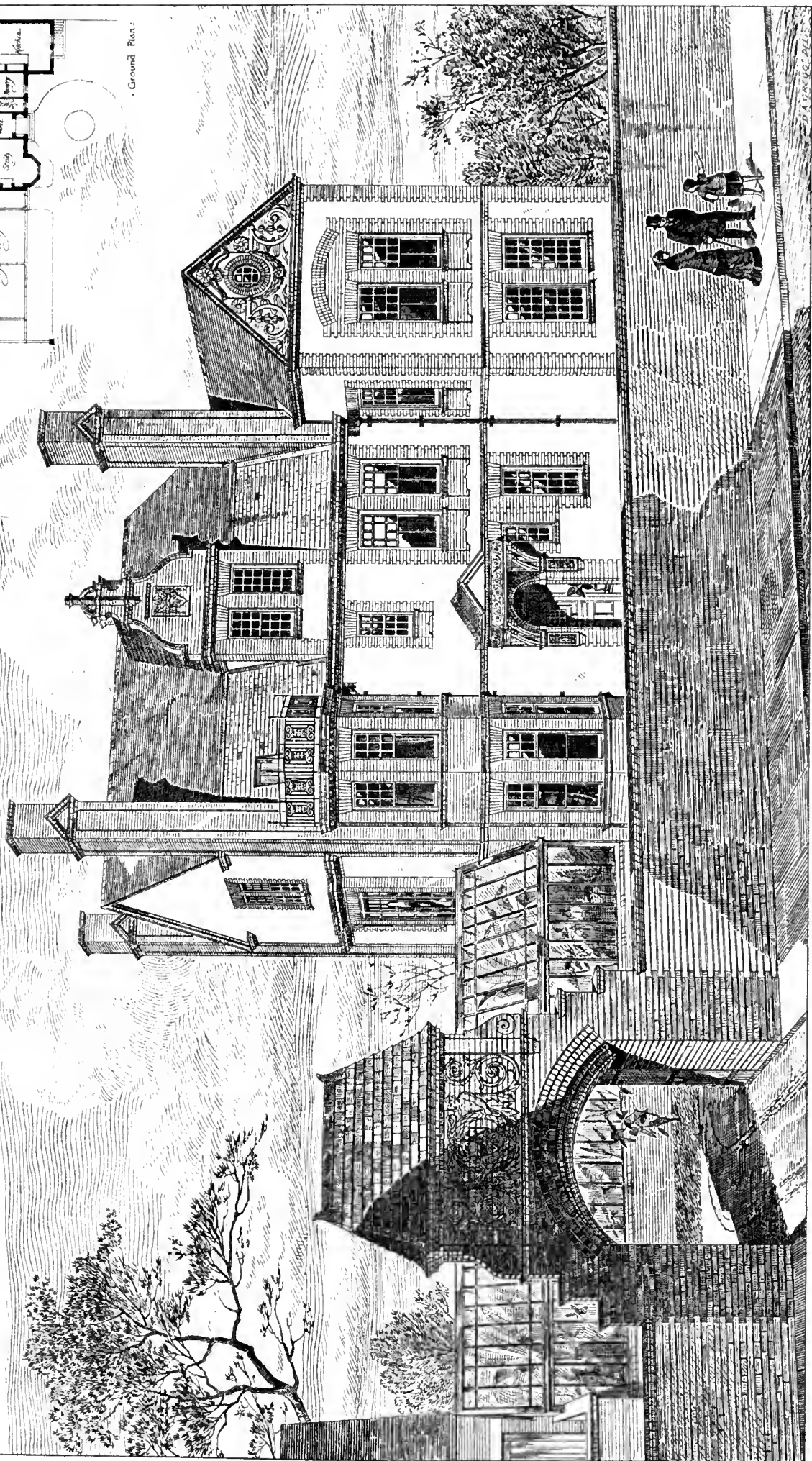


Photo Lithographed & Printed by James Alderman, 6, Queen's Square, W.C.

THE "BUILDING NEWS" DESIGNING CLUB.

DESIGNS FOR A SMALL STABLE.

THIS subject has been well taken up, and a few skilful designs have been sent in. "S" in circle, which we place first, is meritorious in plan, and exhibits a knowledge of the requirements of stable building; in the elevation also the author has shown a considerable disengagement in the treatment of a structure of this class. The stable, 23ft. by 15ft. wide, has two stalls, each 6ft. in clear, and a loose box 15ft. by 11ft. at one end. The coach-house and coachman's rooms form a separate and parallel block, connected to the stable by a harness-room, which is well placed, with a washing-space for horses in front. The width of stable is narrow; 18ft. is not too much. We find that the author has observed a few necessary points, such as that the stable-door should open outwards, and that the hay-shoot and ladder should be placed out of sight of the horses; the former is brought down a shaft in the wall, at the back of the horses. The drains are well shown, but we see no provision for storage nor means of ventilation. Walls of stable, &c., are proposed to be cemented. The windows are small, and do not open at the top, as they ought to do, but otherwise the treatment is characteristic. "Motto J" is an exceedingly simple and picturesque elevation. The plan forms two ranges of building at right angles, the stalls occupying the corner, with a separate loose box adjoining. The carriage-house and harness-room, together with a gateway leading into the stable-yard, form the main elevation; these are conveniently placed, and a manure-store is formed at the end of stable-range. The author proposes stone walling, relieved by brown stone bands. The coachman's rooms and hayloft are placed above the arched gateway and carriage-house, and the former are lighted by projecting casements of wide proportions. The design, though appropriate in general arrangement, certainly affects the antiquated too much, and the windows are too small for effective ventilation. Why the iron girder over coach-house doorway and the heavy stone lintels? "Triangle in Circle" is more modern in spirit, and characteristic as regards elevation. The building is planned as one long range, with the loose box having a separate entrance at one end and the carriage-house at the other. The stable, 17ft. by 14ft., is well placed in relation to the harness-room; the corn-shoot is a four-flued trunk, set in the wall between stable and loose box, and the stove heating the harness-room is made to serve the coach-house, by being placed in an opening in the division wall. The stair to the coachman's room above harness-room is made a feature in the elevation, and is carried up as a pigeon-house. A timber roof (open) covers the coach-house, which has sliding doors and a shed in front for cleaning purposes. Brick walls with mullioned windows are shown, and the author has produced a design that expresses its purpose; but the drawing of the octagon turret in the sketch is a trifle twisty. "Noah" indulges in Queen Anne, and the buildings are made to form three sides of an inclosed paved yard, the entrance separating the dwelling from the stable range. We do not find much to object to, except that the plan is expensive and rather beyond the requirements we had in view. The harness-room is placed at the angle between the stable and coach-house, with a separate doorway into each. We do not like the corn-shoot at the side of the stall, but the hayloft above the harness-room and coach-house is better than a loft above the horses for sanitary reasons, and so is a stable open to roof. Cottam's fittings are proposed. The chief requirements are met. On the other hand, the coachman's house with four bedrooms is unnecessarily large. The walls are proposed to be executed in flint and red brick in the quoins, strings, and window dressing. The loft-windows are circular, and one of the grooms' bedrooms is made to project over the yard entrance with a pediment, and is constructed of timber framing and plaster. The treatment is in keeping, and the drawing creditable. There is much to commend in "No Hope," the author of which has studied extreme simplicity in the exterior, and has adopted a tile-hung upper story with red tile roof. The stalls are arranged one on each side of the loose box which occupies the corner, the harness-room and entrance lobby are conveniently placed, and a door is provided between the harness-room and

coach-house, which is 17ft. by 16ft. and has sliding doors. The living-rooms form another range at right angles, and the two buildings are pleasingly combined. Similar in plan and external design is "Maggie, alias Such a Dog." The stable, 18ft. by 17ft., has the loose box in the corner, as in the former case, but the coach-house is placed at the end of the dwelling range. There is little to find fault with in the position of the doorways and conveniences, but no drainage is indicated. The gables are timber-framed and the elevations are modest and unpretending. "Honey Dew" adopts the one-range plan, and we find the harness-room and coach-house are warmed by the same stove. Economy has been consulted in the construction and arrangement, the whole being contained under one roof. The elevations are neatly but mechanically drawn, suitable and expressive in character, though we take exception to the attenuated proportions of the gabled dormers and narrow windows. We fail to see the advantage of the cement facing to the outer walls. "Omega" is a compact plan, the stable, house, and stable-yard being inclosed within a square. The loose box is placed between the two stalls, the harness-room and washing lobby are conveniently near, and the former and living-room communicate by a doorway between the two rooms. The elevations are artistically treated in brick and tile, the details are plain and effective, and the whole design is creditably drawn. A less expensive plan, however, has "Enigma" for a motto; the stalls and loose boxes are arranged as in the last, but the coach-house and harness-room form one elevation, which is characteristic. The sanitary details are not shown. Treated with some taste, though the details of dormers are preposterously stilted, is "North-west," and we cannot discern the reason of confining the timber framing to the story above the coach-house. In a small stable we think the loose box is best combined with the stalls, instead of being made a distinct apartment. The house behind the coach-house, and without any communication with the stable, is not convenient. "Be to its Merits very Kind," &c., sends a number of carefully-prepared drawings and details. The stable and harness-room are in communication, but separated by a passage entrance with stairs to loft and bed-rooms; the doorway to the stable is too narrow, and the living and bed-rooms above is certainly a most objectionable position from a sanitary point of view, to say nothing of the difficulty of conveying the corn through zinc pipes of the inclination shown. The alternative plan is better, with the loft above the stalls. Sheringham's ventilators are shown to the stables, besides extracting shafts with Boyle's valves; but the author, prolific in details of the finishings to house, does not give any details of the stable fittings or windows. One of the elevations too much resembles a cottage. "Colorado Beetle": this is a rather long and expensive arrangement. It is not desirable to separate the loose box from the stalls, and the latter appear badly ventilated. The gables are rather fancifully filled in with herring-bone and timber-work, and the design is not wanting in merit. "Star in Circle" is inexpensive and compact in plan, but the corn and hay shoot are rather in the way of the entrance to stable, and there is no space for cleaning shown. With a little more time and study spent over the plan, and with a more carefully designed elevation, instead of the very one-sided and awkward gable over loft, the design would have stood higher. The author provides a foul-air shaft from stable through loft to a louver ventilating turret. "Ieh Dien" shows a fancy erection in brick and timber, with an outer stair to living-rooms above coach-house. The harness-room lobby is too cramped for washing; no fittings are shown. "Con Amore" is simple and pleasing as an elevation, but spoilt by the entrance to the stable, which is placed at the end, and is not convenient for the turning of horses; it would be very awkward to lead a horse into the loose box, for instance, and 4 feet cleaning space outside the stalls is insufficient. 5ft. 6in. is not wide enough between the stall boards. "Curiose" is too straggling in its plan. The stable and coach-house would be better closer together than divided by the gateway; there is no washing space, and the entrances to the stalls are not in the best positions. The coachman's dwelling is rather too prominent a feature for a small stable range, though the author

sends in a neatly-drawn and pleasing west front. We can only name the other designs we have received in the order of their merit. "J. C." in circle (clever but costly); "Cleo" (not economical, and undesirable in upper plan); "Sub Silentio" (not expressive, and entrance poor); "Nitor" (wanting compactness, and expensive in style); "Boz" (badly-planned harness-room); "East Anglian" (wasteful in space); "Ogmore" (stalls too narrow, and entrance poor); "I Strive" (expensive in style); "Ivanhoe" (entrance defective). Several other designs, though many showing careful plans and skilful drawings, fail in general suitability of design. Of these we note "Ad Valorem," "XL," "Maltese Cross," "C. W. D.," "Burswell," "Elève," "Veritas Vincit," "Stefano," "Melmotte," "Try," "Peter," "Belteshazzar," "Semper Paratus," "Tam O'Shanter," "Che Sara Sara," "Factable," "Amateur," "Operam Dare."

A SUMMER-HOUSE.

The design with "Colorado Beetle" as a motto, if it does not show a clever artistic working out, has certainly the most ingenious plan. It is a series of four alcoves, with seats forming a quatrefoil in plan, the hollows formed by the inner four angular seats forming three outer seats, the fourth side being taken up by the doorway. The framing is composed of upright angle studs filled with lights, the heads of which are trefoiled. A circular conical roof of heather is suggested, and the narrowest internal diameter is 10ft. In all, there are four alcove seats, and three single seats inside and three outside. "Motto J" is a quaintly-treated but well-drawn design in a species of Queen Anne. In plan it consists of a long-shaped room, with a seat round three sides; the front forms a flat projecting bay, with a step up at the entrance. Externally, the roof is thatched, and of plain span character; the windows are ranged as square small pane sashes round the top, the lower panels between uprights being filled with Lascelles concrete slabs plastered. The timbers 6in. by 6in. are proposed to be painted peacock blue. The plan lacks roominess, and the design is more suggestive of a porch than a summer-house. "Jack" is another cleverly-drawn design, in an Anglo-Japanese style, square in plan, with an alcove or bayed seat on one side, and surrounding seats. At the angles are store cupboards for keeping refreshments and utensils. In the centre of one side is a small fireplace for stove. The sides have sliding sashes, with stained-glass lights above, forming frieze panel, and the roof is of shingles of pyramidal form, with a wrought finial or a louvered ventilator at the apex. A greenish-blue is suggested for the external painting, and lead-lights for the windows. The drawing is somewhat confused with unnecessary constructive lines. Inside, a lining of lath-and-plaster surrounds the lower part, the outer facing being grooved and tongued vertical weather boarding with filleted joints. We can only mention the other sketches in order of merit: "Noah," "Try," "Be to its Merits, &c.," "Truth shall Prevail," "Burswell," "Amateur," and "Ogmore."

CHIPS.

Another historical stained-glass window has been placed in the Guildhall at York. It commemorates the marching, in 1319, of Nicholas de Fleming, Mayor of York, at the head of the armed citizens, against the Scots. It has been designed by Mr. J. E. Doyle, of London, author of the "Chronicles of England," and executed by M. J. B. Capronnier, of Brussels.

An inquiry was held at Halstead, Essex, on the 6th inst., before Mr. Samuel J. Smith, C.E., inspector to the Local Government Board, respecting an application from the Halstead Local Board for sanction to borrow £7,000 for works of sewerage and sewage disposal. The scheme has been prepared by Mr. Bailey Denton, C.E.

A stained-glass window has just been placed in St. Mary's Church, Tadcaster. It is from the works of Mr. Constable, of Cambridge and London. The subjects are: in the centre, "Christ, the Good Shepherd," and in the side lights "John the Baptist Preaching in the Wilderness" and "Paul preaching at Athens."

On Monday afternoon the Macclesfield School of Art was opened. It has been erected at a cost of £5,500. The architect is Mr. James Stevens, F.R.I.B.A., of Manchester and Macclesfield. It is in the Gothic style, and is well lighted and ventilated.

COMPETITIONS.

CITY OF LONDON SCHOOL COMPETITION.—Nothing has transpired of any consequence since our last article. Though a question was put the other day to Mr. Felton, the chairman of the committee, asking whether the City of London School Committee could not now throw open to the public the plans, no satisfactory answer was given, but the chairman's reply was a remarkable one. He said the "committee had not felt themselves justified in throwing open the designs to the public. They belonged to the competitors, who had spent much trouble and pains on them, and without their leave it would be an injustice to them to exhibit the plans." A more absurd reason we have never heard before, as if competitors would not declare in favour of a public examination rather than one conducted with closed doors. No competitor would hesitate one moment to give access to the professional press; indeed, from what we have heard, the surprise is that the designs should have been kept so unpleasantly secret so long. As Mr. Edmeston said justly, it was quite unnecessary to seek consent of competitors, who were not likely to object. In our whole experience of competitions we certainly have never heard a more ridiculous excuse made, as committees who invite competition always reserve to themselves the right of exhibition. But there are certain rumours afloat that make the excuse more intelligible. From an inquiry made at the secretary's office, we hear the report of the committee is to be printed and distributed at the next meeting of the Court of Common Council. This looks as if it were meant that the public, even when they have the chance of criticising, shall not alter the decision.

WOLVERHAMPTON PROPOSED PUBLIC PARK.—On Friday a special meeting of the Wolverhampton Corporation was held for the purpose of receiving the report, which according to instructions had been drawn up by the borough surveyor, Mr. G. E. Thoms, on the twenty-seven designs, sent in by competitors for the laying out of the proposed public park. After considering the report and examining the whole of the plans (the meeting occupying three hours) three of the designs bearing the mottoes "Al Fresco," "Fortuna Sequitur," and "Spe Labor Levis," were selected as the best. "Al Fresco's" design provides a boating lake, a lake for aquatic fowl, recreation ground for girls, gymnasium for boys, volunteer drill and general recreation ground, and archery and bowling greens. The plans of "Fortuna Sequitur" intend the laying out of the site for a drill ground, a cricket field, lakes, archery, and bowling greens, and numerous small patches of lawn with flower borders. "Spe Labor Levis" designs ornamental lakes, cricket, volunteer drill, and archery grounds, bowling green and flower gardens. The borough surveyor was instructed to report again on three selected designs to another meeting of the committee, when the final decision will be made as to the best two, and the letters containing competitors' names opened. Premiums of £50 and £25 are offered for the first and second designs.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

ROMAN VILLA NEAR BOGNOR.—Mr. Hale White writes to the *Athenæum*:—"About a couple of miles west of Amberley Station, on the London and Brighton Railway, near the village of Bognor and the old Roman road from Chichester, lie the remains of a large Roman villa. I am not an antiquary, and cannot profess to describe them, but, according to the guide-books, they are as remarkable as any in England. Anyhow, they are of singular beauty, and most interesting to anybody with the smallest acquaintance with the history of England. The proprietor of the land on which they lie—a small farmer—has done his best to protect them from the weather by building rough huts over them; but during the last winter the pavement has suffered severely, the frost having broken up the ground beneath. Can nothing be done to preserve them? They ought not to be put in the British Museum, for, if removed, the impression of the grandeur and size of the house, of which they are a part, would be altogether lost. We should lose, too, the old Roman's appreciation of landscape, for a lovelier sight could hardly be found in Sussex. We can do a great deal with money; we can build

great palaces and cathedrals which cost hundreds of thousands of pounds, but there is one thing which millions cannot do—we cannot bring back again so much as one square yard of that perfect work, exemplary for generations of builders and architects, which is going to ruin in the Bognor fields if once we are foolish enough to let it decay.

MIDLAND INSTITUTE.—The first excursion of the archaeological section of the Birmingham Midland Institute took place on Monday last. "Tamworth Tower and Town" were first visited. The castle is said to have been founded by Ethelfleda, the widow of Ethelred, Earl of Mercia. The Saxon castle having been destroyed by the Danes or Normans, a new castle was built in the reign of Henry I., by Sir Roger Marmon, on a much more extensive scale. Although it cannot be proved that a single fragment of the original walling remains, there are good grounds for believing that the lower part of the curtain wall, of herring-bone masonry, which now supports the path across the ditch to the entrance, is the work of Ethelfleda, and it is also possible that some fragments of the original outer wall remain near the ground. Be this as it may, it is certain that large portions of the Norman wall remain, but it has been so patched and repaired, and is so much hidden by ivy, that it is impossible to say how much. Of the outer wards and works of the Norman period not a vestige is visible. Within the present great outer wall—three yards thick—are the inhabited rooms of the existing building. These are all of much later date, the oldest parts—the hall, kitchen, and dining-room—being probably of the time of Henry VIII. Large additions were made in the time of James the First, and still later. After luncheon at the castle, the party proceeded in carriages to Staffeld, where the curious little disused chapel was examined. It contains some curious recumbent effigies and many mural monuments; the old oak benches and wood screen remain, and a quaint seventeenth-century pulpit and sounding-board, but all covered with dust. In the east window is some interesting old glass, probably Flemish. This was put into its present position only a few years ago. The building has a western doorway, door, and lock, all of which were pronounced to be of the twelfth century, but the greater part of the building is of the fourteenth century date. The party next went on to Clifton Campville, and examined the church. The building is throughout of nearly one date, the fourteenth century. There are, however, portions of the chancel about one hundred years earlier. Elford, about five miles from Tamworth, was next visited, and after tea the party went to the church, which has been rebuilt, all but the tower, by Mr. Salvin and Mr. Street.

NORTHERN ARCHITECTURAL ASSOCIATION.—The annual meeting of the above association was held on Tuesday evening at Newcastle-on-Tyne, when the retiring president, Mr. T. Oliver, delivered his address. Touching on ecclesiastical architecture, he said—"It is not necessary that our churches should be identical, either in architecture or in ritual: they should represent, I think, the variety of man's religious convictions, feelings, and requirements, while, at the same time, they should unmistakably represent the oneness of all true religion. It is not with any degree of regret that I perceive in the 'new departure' from the Gothic of Pugin and Scott, the sign of an active living art; for just as it was considered perfect in the fourteenth century, and it passed away, so is it now. Shall it be superseded by Perpendicular Gothic, Romanesque, or the Italian Renaissance? All architecture has been engrafted. As stone took the place of wood, and the rock-cut temples the place of dismal caves, imperceptible architecture reared its inexplicable and beautiful forms, first upon one civilisation and religion, then upon another, until it culminated in Christian Italian and Mediæval Gothic. Those imbued with the like spirit that inspired our predecessors, may select and combine, and in so doing produce a new and harmonious style of architecture more particularly adapted to our age and to our wants." Mr. Oliver then referred at some length to the question of the Free Library and the Weavers' Tower; and on the subject of plans, he said if the matter had been put to competition, he had no hesitation in saying that they might have had a design worthy of a town like Newcastle. "It is to be hoped," he continued, "that if the Carlisle Tower should be removed, the ridiculous

ideas of transferring it or recording it by marble mosses, or engraving a plate like a coffin plate, will be abandoned. If it must go, let it go, and bury the bad feeling along with it. But if it can be saved, by all means let it be done."

CHIPS.

On Tuesday week the Archbishop of York reopened the fine Church of St. Peter, Pickering, after restoration at a cost of £7,000. The works have included the rebuilding of transepts, which are all Early English period, the reseating and decoration of nave, taking out and renewing the foundations of the fine Roman tower, which had been much damaged by weather, re-roofing the chancel with Riga oak, and opening out an ancient chapel in chancel. During the restoration three fine piscinas and several lancet windows were found walled up in the chancel, as well as a magnificent fresco of the "Lord's Supper"; there were also discovered in the chancel some effigies of the Lascelles, the de Gaunt, and the de Brus families. Five memorial stained-glass windows have been placed in the church, and in the tower a public clock has been erected at a cost of £150. Mr. J. S. Crowther, of Manchester, was the architect for the restoration.

The foundation-stone of a new Roman Catholic school was laid at Thetford, Norfolk, on Tuesday week. Mr. J. B. Pearce, of Norwich, is the architect, and Messrs. Hubbard, of Dereham, are the contractors.

The parish church of Moor Monkton, near York, was reopened on Wednesday week, after complete restoration at a cost of £1,600.

The Scarborough town council have appointed Mr. W. Millhouse, of Leeds, as draughtsman in the borough surveyor's office. There were 89 applications for the post, to which is attached a salary of £175 per annum.

A new organ was opened at Castle Heddingham Church, North Essex, last week. The builders are Messrs. Walker and Son, of Francis-street, W. The organ contains two complete manuals and a pedal-organ, and cost £325. The casing is of simple character, stained, the front speaking-pipes being decorated.

The new market halls at Holywell were opened on Tuesday week. They consist of a parallelogram, 65ft., by 45ft. for vegetable market, with brickwork walls, covered with a roof of wrought-iron principals, with pitch-pine boarding under slates, in two spans, supported by a row of columns; and of a butchers' market, 69ft. by 48ft., constructed in a similar manner. A town hall to be hereafter built in front is part of the scheme. Messrs. Scrivener and Sons, of Hanley, Staffordshire, are the architects, and Messrs. Thomas Hughes and Son, of Holywell, the contractors.

The town council of Reading have decided to commence forthwith the construction of the new town hall, free library, museum, and schools of science, to be built adjoining the present town hall, in Blagrove-street.

A new memorial clock has been placed in the tower of All Saints' Church, Parleigh, Essex. It has been manufactured by Mr. J. W. Benson, of London. The frame is of cast-iron fitted with runner blocks to facilitate cleansing; the escapement is Graham's improved dead beat, and the clock strikes the hours on the tenor bell on the rack repeating principle. The time is shown on two dials of copper 4ft. diameter, painted black with gilt figures and hands.

An institute and cocoa-house, including public room, lecture-room, and library, is about to be built at Brymbo, near Wrexham. Mr. H. A. W. Robertson, of Penrhos, Brymbo, is the architect.

The West Kent Main Sewerage Bill has been read a third time, and passed in the House of Commons.

The convocation of Oxford University decided last week, after a division, to let ten acres of University Park as a cricket ground, and to erect a pavilion thereon at an expense not exceeding £2,000.

The memorial stone of a new Congregational church was laid at Aberdovey on Tuesday week; it will seat 300 persons, and is to be built of limestone and granite.

Mr. John Hughes, of Llansannan, has been elected surveyor of the highways in the newly-formed district of Henllan, Llancfrydd, and Llansannan, at a salary of £60 a-year.

A new parish-room is in course of erection in Upper Cranfield-street, S.E., New Cross, in connection with St. Peter's Church. It is semi-Gothic in style, and in addition to a hall seating 400 persons, there are six class-rooms and the usual conveniences. Mr. J. O. Abbott is honorary architect, Messrs. Bann, Julian, and Co., of Southwark, are the contractors. The total cost of erection and furnishing is estimated at £3,000.

Building Intelligence.

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BOLSTERSTONE.—The parish church of Bolsterstone, Yorks, was reopened last week, after having undergone a thorough restoration. The whole of the work was not done at one time, the chancel and tower having been rebuilt in 1873, at a cost of £1,800. The rebuilding of the nave has only just been completed at a cost of £2,300. The building, which is of substantial proportions, is in the Early Pointed or 15th Century style of architecture. Its dimensions are—tower, 12ft. by 12ft.; nave, 43ft. by 24ft.; aisles, 43ft. by 12ft., and chancel, 31ft. by 20ft. The open seats are of pitch-pine, and provide comfortable accommodation for 360 persons. The architect is Mr. J. Fawcett, of St. James' row, Sheffield; the clerk of the works is Mr. D. Brierly; the builder, Mr. J. Brierly, of Bolsterstone.

BOURNEMOUTH.—The Hahneman Convalescent Home was opened last week by the Lord Chancellor, who laid the foundation-stone of the building in the beginning of last year. The Home is situated on a plot of ground on West Cliffe, and is faced with Highbridge red bricks, and with terra-cotta arches and dressings. The walls to the rooms internally throughout have been dis-tempered with the Patent Silicate Co.'s washable grey distemper, the hall and staircase having a dado in Venetian red, with a stencil border of floral pattern. There is accommodation for 15 indoor patients; there is also good servants' accommodation; the health and comfort of the patients have been thoroughly considered in regard to sanitary and ventilation regulations, each room having been provided with fresh air (warm and cold) ingress, and also for the outlet of foul air, Banner's patent foul-air extractors being used to the extracting flues. The heating of the building has been properly considered and arranged. The work has been carried out satisfactorily by Mr. J. McWilliam, contractor, for £2,500, under the superintendence of the architect, Mr. C. C. Creeke, of Bournemouth.

CONFORD ST. MARY, WILTS.—This parish church has been restored from the designs of Mr. E. H. Lingen Barker, architect, of 7, St. Owen's-street, Hereford, and was reopened by the Bishop of the Diocese (Sarum) on the 11th inst. The original church consisted of nave and chancel, separated from each other by a pointed arch, springing from two circular columns with rudely ornamented capitals of Late Norman character. A south aisle, and west of the chancel, an eastern chapel were subsequently added. The present restoration has embraced new roofs, covered by tiles, the timbers within being open, and plastered between the rafters. The walls have been recoloured, the stone pavement of the passages and the chancel taken up and replaced with encaustic tiles, and new floors have been laid down. The woodwork of the tower is altogether new, the old and cumbrous west gallery has been removed, and the beautiful western window opened out. A large new window has been inserted in the south aisle, and the east window is also new. A new lancet-headed window has also been put into the south side of chancel, and a dark corner in the north-west of the nave has been relieved by a similar course. The handsome western porch has been rebuilt, and the church reseated throughout. A new warming apparatus has been laid down, and a new vestry of commodious proportions built. The churchyard has been levelled and surrounded by a substantial and handsome dwarf wall with new oaken gates, and the outside of the church is protected from the ravages of damp by a paving with channels to carry off the water. Mr. William Balcombe, of Kenilworth, Warwickshire, was the contractor, and the carving was done by Mr. Harry Hems, of Exeter.

ECCELES.—New cemetery chapels at Eccles, near Manchester, have been erected. The style adopted is Geometrical Gothic, of a simple substantial character. The chapels are widely varied in design, and in each a bell-turret forms a conspicuous feature. The material used is brick faced with Dmford Bridge parpoints, the dressings being of Runcorn stone. The walls are plastered inside, except in the coffin aisles. The woodwork generally is of pitch-pine, stained and varnished. The chancels, coffin-aisles, porches, and passages are laid with red and black Staffordshire tiles, and the windows throughout are glazed with quarries of various

tints, the heads being fitted in with geometrical patterns. The cost of the three chapels, lodge, and entrance gates is about £3,800. The builder, Mr. Napier, of Manchester, has carried out the work from the designs of Messrs. A. H. Davies Colley and J. W. Beaumont, the joint architects, to whom the first prize was awarded in open competition in 1877. The Roman Catholic chapel and burial ground were consecrated on Saturday last. The Church of England chapel, &c., were consecrated on Monday. The Non-conformist chapel will be opened to-morrow.

ELTHAM.—The parish church, which was rebuilt in 1874-75, by Mr. J. G. Naylar, of Rochester, from the designs of A. W. Blomfield, Esq., at a cost of upwards of £6,000, is, at last, to have the old adjacent wooden spire removed, and a new stone tower and spire, by the same architect and builder, substituted. The amount of the tender is £2,677, but through a scarcity of funds the committee are at present only entering into a contract for the erection of the lower part, at a cost of £1,500, although they strongly hope that before the lower part is finished sufficient funds will have come in to enable them to complete the whole. Mr. Naylar was also the successful competitor for the erection of the Congregational Church, Holy Trinity Church, National School buildings, and Parochial room, all of which have been erected here within the last ten or twelve years.

LLANSANNAN.—The parish church of this village, formerly one of the most unsightly buildings in the diocese of St. Asaph, both within and without, was reopened on Thursday, the 12th inst., after restoration effected at a cost of £1,100. The old window openings on north and south sides have been filled with two-light lancets with pierced circular heads, in place of circular-headed ones, and three-light windows are placed at the east end of the nave and aisle of which the building consists. New freestone copings are placed on the gables, and a bellcote built between the western ones. A new porch has been erected, of wood framing on a stone base. The roofs have been reslated, the old lath-and-plaster ceilings are replaced by coed ceilings of red deal battens, divided into panels by ribs. In place of iron columns the arcade is now formed by wooden posts, chamfered and moulded and set on stone bases. The old pews, gallery, and flooring have been removed, and the plaster stripped from the walls. Open seating for 144 persons is now provided, and a place left at the west end for the placing of chairs as required. The floor of the chancel has been raised. The passages are of tiles in pattern, supplied by Webb's Worcester Tiley Company. The woodwork of ceilings, posts, screens, seats, door, and porch have been stained and varnished. The alterations have been carried out from the designs of Mr. R. Lloyd Williams, architect, of Denbigh.

MANNINGHAM.—The new Wesleyan chapel of St. John, at Park View-road, Manningham, was opened on Wednesday week. The building in the Early English style, has been erected from the designs of Mr. C. O. Ellison, architect, Liverpool. The chapel has a wide nave, covered by the roof in one span, the length is 113ft. 6in., the transept is 52ft. wide, and the chancel is 24ft. deep and of similar length. Accommodation is found in the body of the place for 750 worshippers, and in the side galleries for 250. The pulpit, font, and reredos are composed of Caen stone, with shafts of Mexican onyx, Derbyshire cavern spar, and Derbyshire marble. Messrs. W. Ives and Son were the contractors. The chapel and approaches have cost about £8,000.

MARY TAVY.—The reopening of St. Mary Tavy parish church, after restoration, took place on Tuesday week, under the most favourable auspices. The restored church is of the Early Perpendicular style, and was probably erected at a time contemporaneous with several other in this part of Devon, viz., during the 14th or 15th century. The contractor was Mr. P. Blouey, of Buckland, and Mr. J. P. St. Aubyn was the architect. The entire cost will be about £1,300 or £1,400. The belfry has five bells, and the tenor bell has been recast by Messrs. Warner, of London. The flooring is of Somersetshire tiles, with the exception of the chancel, which is fitted with Maw's encaustic tiles. The seats will accommodate from 100 to 150 persons.

METROPOLITAN BOARD OF WORKS.—At this Board on Friday, a desultory discussion arose with reference to a report brought up by the

Works Committee concerning the placing of accessories around Cleopatra's needle. A large model of the obelisk was exhibited, with the additions suggested by Mr. Vulliamy, the Board's superintending architect, in association with the engineer. It is proposed, in order to obviate as far as possible the present seemingly insecure base of the monolith caused by the rounding off of the corners, to enfold semi-dragons' wings around each angle, connecting these by a waved ornament in copy of the official monogram of Thothmes III., in whose reign the obelisk was hewn. The granite pedestals on either side of the obelisk is to be lowered and reduced in size and upon each is to be placed, facing the obelisk, a sphinx modelled from one in the possession of the Duke of Northumberland, which is of the period of Thothmes III. The sphinges and pterons, &c., are proposed to be of bronze. During the discussion some curious criticisms of the obelisk, its site, and the suggested accessories were offered; but eventually it was agreed to have plaster casts made, coloured to resemble bronze, for the temporarily garnishing of the Needle. Owing to the death of Mr. James McCleary, surveyor to the Board, the following promotions were made—Mr. James Bell, from second to first-class officer in the Engineer Department, at a salary of £200 a year, and Mr. John Pollard, from third to second-class, at £150 a year, Mr. J. McCleary, son of the deceased officer being appointed temporarily in the department at £100 a year. An offer was recently made the board by a Mr. F. Thompson, offering to erect a permanent glass roof over the greater portion of Leicester-square at his own sole cost, but it was decided to reply to him, stating that the board are not prepared to adopt the suggestion. The resignation of his seat, as representative of St. Luke's Vestry, was tendered by Mr. Joseph Storey, and was accepted. A letter was received from the Vestry of St. George-the-Martyr, Southwark, transmitting an extract from the report of their medical officer of health, stating that the houses in the several areas comprised in the artisans', &c., dwellings scheme in the parish are entirely unfit for human habitation in their present condition, and suggesting that the houses be immediately closed. It was referred to the works committee, as was also Sir H. A. Hunt's provisional award in relation to the Whitecross-street, St. Luke's, improvement scheme under the Artisans' Dwellings Act, 1875.

QUEENSTOWN CATHEDRAL.—St. Colman's R.C. Cathedral, for the diocese of Cloyne, erected on a hill-top overlooking Queenstown Harbour, was opened on Saturday. It has been in course of erection since 1868, from the designs of Messrs. Ashley and Pugin, of Dublin, and has thus far cost £80,000, but another £20,000 will be needed to complete the scheme. The style is 14th century Gothic, and the plan includes a tower, baptistery, nave, chancel with apse, north and south aisles, transepts, side chapels, and sacristies. The dimensions are: external—length, 210ft.; width across transepts, 121ft.; width across nave and aisles, 81ft.; internal—length, 190ft.; width across transepts, 106ft.; across nave and aisles, 70ft.; and with confessionals, 81ft.; and across nave, from centre to centre of columns, 37ft. A tower, 300ft., forms a part of the scheme not yet carried out. The west front is divided into three spacious entrances, and above will be a wheel window 25ft. diameter. The walls are faced with masonry, and the dressings, internal walling, wall shafts, and corbels are of Bath stone. The arcades are supported on columns of Cork red marble set on Sicilian marble bases, with limestone plinths, and having Portland stone capitals. The arcades between the side chapels and the chancel are supported by coupled columns of Cork red and Galway green marble alternately. The triforia are supported on shafts of red Aberdeen, surmounted by enriched canopies; from the level of the clerestory windows spring. The wall space is left to be hereafter filled with sinking and medallion, inlaying and jewelling with balls of green, red, and white marble. The prevailing carved ornament in the building is a shamrock, emblematical at once of Christianity and nationality. All the wall work, with the exception of the transept windows, has been completed, and also the six turrets, each 120ft. high, set on either side of the west gable and north and south transepts. The slates are on the ground ready to go on the roof over its present covering of

asphalte and the inner lining of oak. The interior furnishing is as yet of a temporary character, from the high altar to the seating for the congregation, and the grooming and carvings are also incomplete. The process of erection has been unusual. The foundations were laid by the building committee, under the immediate supervision of Mr. C. Guilfoyle Doran, clerk of works, and directly controlled by the architects. The contract for the superstructure was taken by Messrs. Meade and Son, of Dublin, but owing to a misunderstanding with the building committee the firm relinquished their contract in 1871. Since that time the committee have resumed the original method of working under Messrs. Ashley and Pugin and Mr. Doran, and they are still proceeding without interruption.

ROUPELL PARK, S.W.—The foundation-stone of a Wesleyan chapel in course of erection immediately opposite the Tulse-hill Railway Station was laid on Wednesday week. The church, which is designed in the Early English style, will be 136ft. long, and 55ft. wide, and will be constructed of Kentish ragstone, with moulded tracery and facings. The chancel will be of semi-circular design, 31ft. deep. The columns will be of polished Shap granite, with carved stone caps, the five arches forming the arcade being finely moulded, with similar bases. The walls will be of good thickness, and will be stuccoed. The seating will be of pitch-pine stained, and the area will accommodate 720 persons, the gallery holding 280. The roof will be of fine stained deal, wagon-headed; and in the basement will be six vestries, two classrooms, library, prayer-meeting-room, and infants' school. The large school-room, also in the basement, will be 51ft. by 50ft. The spire will rise to a height of 150ft. The architect is Mr. R. Bell, of 4, Union-court, Old Broad-street; and the builders are Messrs. J. and C. Bowyer, of Upper Norwood. The cost is £10,000.

SALISBURY.—The new Congregational Church in Fisherton, Salisbury, was opened for public worship on the 11th inst., when all the services were well attended. The church is built in the Early Decorated style, and consists of nave and aisles, with an apse, or recess, at the end, an organ-chamber and vestries, and tower and spire at the south-east angle, there being two entrances in the front and a side entrance to the vestries. The walls of the church are of concrete, faced externally with Swanage stone, in drop-coursed work, having for dressings, &c., Corsham Down stone, and internally with brickwork, which is finished with Portland cement stucco. The ceilings are of plaster, with the main timbers of the roof exposed to view, thus forming panels. The woodwork is of pitched pine stained and varnished, and the passages and centre of the apse have tiled floors laid to pattern. The large window in the apse is filled with stained glass by Mr. Drake, of Exeter, and was presented by Dr. Nathaniel Rogers, of that city. The arcades that divide by five bays the nave from the aisles stand upon octagonal bases, the columns are carried well up, and circular capitals support the arches themselves. The arch of the recess is a fine piece of masonry, carried on carved capitals, under which are columns and ornamental corbels. The organ stands upon a dwarf Bath stone panelled and carved screen; and the end of the recess beneath the stained glass window is divided into four triple-headed bays, supported by double red Mansfield columns with carved capitals. The spandrels between and over these arches are filled with diapered work, interspersed with paterae in large circles. The front of the church consists of the gable end of the nave pierced with a large five-light window, with geometrical tracery in the head, having attached columns on jambs, with carved capitals and moulded bases. Under this window extends sunk panelling in Bath stone. Lower still are three single-light windows. On the left is one of the entrances, and on the right is the tower and spire, and connected with the nave by a vestibule in the tower is the second front entrance. Both the entrances have a gabled and moulded arch filled in with sunk panelling over the doorways, these being supported by detached columns with carved caps and moulded bases. The total internal length of the building is 105ft. 6in.; the width, 49ft. 6in. The height of the nave is 50ft., and the height of the aisles 20ft. The arched of the clerestories is carried on Portland stone columns, with moulded capitals and bases. The tower

and spire rise to a total height of 132ft. to the top of the vane; the tower is built in three stages, the lower being one of the entrances to the chapel, the next being a chamber for ringers or store-room; and the third for bells, a circular staircase at the side of the tower giving access to the upper stages. The designs were furnished by Messrs. Tarring and Wilkinson, of London, and the work has been carried out in a most praiseworthy manner by Mrs. Hale and Son, of Salisbury, the carving being executed by Mr. Harry Hems, of Exeter.

OWERBY.—The church at Sowerby was reopened on Wednesday week after restoration. It was built in 1762, and is in the Italian style, having a nave separated from aisles by an arcade of the Corinthian order, and galleried round, and an eastern apse. The roof to the nave having been found to be unsound, it has been completely repaired, and the plastered ceiling replaced, two large sunlights being inserted into it. A partition which separated the western bay into an ante-chapel has been swept away, the organ has been placed at the east end of the north aisle, and a vestry formed in a corresponding position on the south side. All the pews in the area of the church have been taken down, and the wood converted into open benches; the passages have been laid with tiles, and Tobin's ventilators and Lumley's heating apparatus have been placed in the church. By placing a screen on either side the eastern bay of nave, a quasi-chancel, 20ft. in depth, has been formed. The side screens are Italian in design, and are formed in Caen stone, the shafts being in various coloured marbles, and the capitals boldly carved. The dwarf screen separating nave and chancel is of red granite and serpentine, with the panels filled in with rare marbles. The floor of the chancel throughout is laid in mosaic tilework; the steps and altar foot pace are of white marble. The holy table and choir stalls are of oak. A new pulpit will soon replace the large three-decker. Three windows have been filled with stained glass, by Messrs. Heaton, Butler, and Bayne, of London; the subjects are "The Charge to St. Peter," "The Baptism of Our Lord," and "The Charity of Doreas." The works have cost £3,000, and have been carried out from the designs of Messrs. Middleton and Son, of Cheltenham. Mr. Crawshaw was the contractor for masonry, Messrs. Haigh for joinery, and Messrs. Baneroff, of Halifax, for plastering. The brass lectern was made by Mr. Letheran, of Cheltenham, and the mosaic floor has been executed by Messrs. Powell and Son, of London.

TONBRIDGE.—The parish church was reopened on Wednesday week, after complete restoration, from the designs of Mr. Ewan Christian, carried out at a cost of £14,000. The stucco has been removed from the external walls, which have been repaired and re-pointed. The unsightly iron bands have been removed from the tower, which is considered perfectly safe without them. In the interior, the galleries have been removed, the walls uniformly stuccoed, the high-backed pews replaced by open seats in teak, and the nave roof entirely renewed in open timber construction. The south aisle has been rebuilt and re-roofed, and an additional aisle added, extending as far as the chancel, so as to form an organ-chamber and vestry. The new pulpit, of oak and teak, well carved and supported by a carved stone pedestal is a special gift. The new font is of Hopton Wood stone, and stands on a white stone base surrounded by Devonshire marble columns. The lighting is by gas coronae, and the heating by hot-water apparatus. The passages have been paved with encaustic tiles. A small stained-glass window has been placed in the chancel. In the tower is a new clock, made by Messrs. Moore and Sons, of Clerkenwell. Messrs. Punnett and Sons, of Tonbridge, were the contractors, except for the reseating, which was carried out by Messrs. Cornish and Gaymer, of North Walsham, Norfolk.

TRURO CATHEDRAL.—At a meeting of the executive committee of the Truro Cathedral Fund, held last week, Mr. Pearson submitted his plans for the new cathedral, and it was agreed to recommend them to the General Diocesan Committee, with a suggestion that the first part, consisting of the choir and its aisles, should be commenced immediately, at a cost not exceeding £35,000. The plans display the chief points of a structure in the 13th Century style of architecture, and include a central and two western towers. The ground plan shows the proposed

ultimate erection of a cathedral proper, with nave, aisles, transepts, and choir, together with cloisters and cloister court. The space under the choir will be used for vestries, temporary chapter-room, &c. It is proposed that the aisle of the present church should be worked into the building, and the south porch of the transept is made perceptibly richer in order to blend with the more profuse ornamentation of the south aisle wall. At the west end of the old aisle there is a tower, in which it is proposed to place the present peal of bells, and on it will be a clock. This tower and the old aisle (which is to have an altar at the east end) will form the old parish church of St. Mary, but the tower will be the only one till one of the great cathedral towers is built. This, however, will not be included in the first part of the work, which will be confined to the east end of the building. The cost of the nave and transepts is estimated at £60,000, in addition to the portion of the scheme now in contemplation.

CHIPS.

The Wakefield Town Council have directed Mr. Colcutt, the architect of the new town hall, now approaching completion, to provide four faces to the clock in the tower, and to procure tenders for the same. At the same meeting tenders for fittings and fixing pipes in the town-hall were considered, and that of Mr. Wm. Holdsworth, the general contractor for the works, was accepted. Three bells for the tower, one for striking the hour and two for use in case of fire, were ordered of Messrs. Taylor, of Loughborough. At the same meeting some grumbling arose as to the fittings of the town hall, which were alleged to be very expensive, about £14,000, and the total cost was said to be far in advance of the original estimates.

Mr. Joseph Cooper, F.S.A., of Kingston, near Lewes, died on Sunday week, aged 46 years. As an ardent archaeologist, Mr. Cooper devoted great energy to the Sussex Archaeological Society, and his contributions to their "Collections" have been numerous and valuable. Unfortunately, his papers relating to antiquarian researches in the neighbourhood of Lewes, Swanborough, and Kingston have been left unfinished.

The members of St. Paul's Ecclesiological Society will visit the chapel of Lambeth Palace on Saturday afternoon (to-morrow) under the conduct of Mr. John P. Seddon. Members are to meet at 4 p.m. in the first courtyard of the palace.

The Iron and Steel Institute have accepted an invitation from the Mayor of Liverpool to visit that town; they will probably hold their meetings there on September 24th, 25th, and 26th.

The project of erecting a monumental statue to John Knox in Edinburgh has been revived, and a committee has been formed to carry out the intention.

All Saints' Church, Eastbourne, was consecrated on Wednesday week. It consists of a nave, side aisles, and chancel, and is built of Kentish rag with Bath stone dressings. At a future day a tower and north and south aisles to chancel are to be added. The seats are of pine and the pulpit is of dark oak and ebony. The architect is Mr. Streatfield, of Marlborough-street, London, W., and the contractors are Messrs. Carruthers, of Reigate. The outlay has been about £11,000.

Mr. Thomas Oliver, architect, of the firm of Messrs. Oliver and Leeson, has received instructions from the Newcastle School Board to report upon and prepare designs for enlarging the extensive Board schools at Westmerland-road, in that town.

A new vicarage is being erected for the parish of Locking, Somerset. The architect is Mr. A. Whitehead, of Clevedon; and the contractors are Messrs. Perry and Harvey, of Weston-super-Mare.

The extensive premises erected some few years since by the Worle Brewery Company, Somerset, have recently been purchased by the Weston-super-Mare Sanitary Steam Laundry Company (Limited), who are now making the necessary alterations and additions for carrying on their business on these premises. The works are being executed, under the superintendence of Messrs. Price and Wooller, by Messrs. Perry and Harvey, of Weston-super-Mare.

Mr. John Pinches, of 27, Oxendon-street, S.W., has sent us one of the medals executed and struck by himself, from the design of Mr. J. P. Seddon, to be given as prizes at the Westminster Industrial Exhibition. The design of the medal is sensible and good, and the execution all that could be desired.

The parish church of Oakwood, near Dorking, is undergoing restoration and enlargement. Messrs. Colls and Sons, of London, Camberwell, and Dorking, are the contractors.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

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RECEIVED.—C. A. H.—B. B. Co.—J. C. and Co.—W. McF. and Co.—T. E.—C. and G.—J. D. Y. and Co.—S. F. C.—B. B.

APPEAL.—(We cannot advise on the very insufficient data forwarded. What you call "whims and ideas" may be important matters in the architect's estimation. If you have a written contract your position is probably defined therein.)—J. J. C. (Only section and sketch are required. Sheet to be 14in. by 22in.)

Correspondence.

THE SO-CALLED STOUP AT LEWANICK.

To the Editor of the BUILDING NEWS.

SIR,—This is a very curious object, and one would like to have more information about it, and especially as to its exact position in the church. Will Mr. Hens give us a sketch plan? It is not a stoup, but a cross-stone—a very rare thing to find in a parish church. From the woodcut, I doubt whether the base and the top belong to one another.—I am, &c.,

J. T. MICKLETHWAITE.

GLOUCESTER ASYLUM COMPETITION.

SIR,—We have here a new phase of the evils of competition, viz., the apparent coincidence of interests of the architect and the doctor; at any rate, the remarkable way in which the medical man writes up one design is, to say the least, highly objectionable. If you can do anything to stop this very dishonourable mode of proceeding, you will help the profession generally.—I am, &c.,

SUB ROSA.

SIR,—The letter of your correspondent of last week is very unfair and untruthful.

I can assure him the Visiting Committee do not know the plan he mentions.

No plans were prepared before the competition by the County Surveyor on the magistrates' instructions.

The County Surveyor is not a salaried officer; he merely receives a small retaining fee of five guineas for attending Quarter Sessions.

The whole of the preliminary plans and details for the preparation of the instructions to architects were prepared by the salaried officer, the Clerk of County Works, whose name your correspondent will see on the plan of estate supplied to competitors, and his appointment debars him from competitions of this kind.—I am, &c.,

FAIR PLAY.

NEW WESLEYAN COLLEGE, BIRMINGHAM.

SIR,—I congratulate the successful candidates in this competition on their beautiful designs, and the committee for so loyally following the advice of their referee, but it appears to me there is one paragraph in Mr. Waterhouse's report which is manifestly unjust to the remaining competitors, and calculated altogether to mislead the committee. The report says:—"In making these awards, I have compared and weighed the 42 designs—first, by the scales of the conditions, ascertaining their general adherence to these conditions, and especially to that of cost."

£23,000 is the sum named in the conditions which is to cover the total cost of college, out-buildings, boundary walls, &c. Now, does Mr. Waterhouse mean to tell us that the design placed first, "Ut Migraturus Habita," can be carried out for anything like that amount? Let not the committee lay that flattering unction to their souls. Having gone carefully into the question, I should call it a very cheap building at £30,000, and I question if any builder of substance could be found to undertake the works at that figure.

The large central tower, about 20ft. square and 70ft. high, is no doubt a beautiful feature in itself, but it serves no practical purpose, and every penny spent upon it will be in excess of the stipulated sum. There is a great waste of space, too, in the corridors, if the instructions are to be fairly interpreted. I think the design very handsome, and the plan one of the best in the room; but, with the greatest respect for Mr. Waterhouse's eminence, I venture to assert that his report, so far as the question of cost is concerned, is not only illogical, but unjust.

£23,000 is barely sufficient, with the most rigid economy, for the buildings required by the conditions, and it is somewhat disheartening to those competitors who have endeavoured to keep within the limit to find their labours thrown away in favour of a design which, however beautiful, practically ignores the important element of cost altogether; and I would submit that some explanation on this point is due from Mr. Waterhouse. I inclose my card, and am, &c.,

CANDEUR.

CHIPS.

A meeting of the creditors of William Brown Spencelayh, iron founder and Government contractor, carrying on business at Chatham and Rochester, has, according to the *Echo*, been held this week at Rochester. The liabilities are estimated at £20,000. It was agreed to accept a composition of 4s. 6d. in the pound, payable in six months.

Excavations are being conducted at the Roman Cemetery, Scaford, by Mr. F. G. Hilton Price, F.G.S., and Mr. J. E. Price, F.S.A., and have yielded several urns of Upchurch ware, containing burnt bones, &c., specimens of Samian and Dunrobrivian pottery, flint cells, flakes and scrapers, and also a Roman coin of either Faustina or Antonia.

An inquiry was held at Margate on Thursday last week, before Mr. Arnold Taylor, C.E., an inspector of the Local Government Board, with reference to an application from the Margate local board for sanction to the purchase of the undertaking of the Margate and Broadstairs Waterworks Company, and for sanction to borrow £60,000 for such purpose, and £7,000 for works of street improvement. The rate of purchase for the Water Company was stated to slightly exceed 23 years' profits. In the course of the inquiry as to street improvements, the inspector stated that if the Town Council obtained a loan to execute certain works in a certain material they could, if they so desired, carry it out in a better and more durable material and defray the extra cost out of current rates.

The last vestige of Temple Bar—the piers on the southern side of the Strand and Fleet-street—were cleared away by the contractors on Friday night and placed with the other numbered stones on the vacant ground in Farringdon-street. The erection of the street front of Messrs. Child's new banking premises, from the designs of Mr. John Gibson, is being rapidly pushed forward.

At Silksworth, near Sunderland, a new Wesleyan chapel has just been opened. It seats 500 persons and has cost £1,300.

Intercommunication.

QUESTIONS.

[5805.]—**Eddystone Lighthouse.**—I shall feel obliged if any of your correspondents will inform me the cost of the lighthouses built on the Eddystone rock by Winstanley, Rudeyard, and Smeaton respectively.—Thos. PROCTOR.

[5806.]—**Builders' Day Account.**—I have lately finished a large contract, under a London architect in the provinces, and before this contract was complete orders were given me by the building committee, not under the supervision of the architect, for sundry internal fittings, chiefly joiner's work, also alterations to plumber's work, &c. These works have been kept in my books as "Labour and material." No doubt the committee had an eye to "Architects' commissions," as I was requested to give rough sketches to them of the works before commencing, but no question as to cost. I was asked for my account, which they now have, a weekly statement of all the work as clearly given as it is possible to make out one of these accounts. Of course, when they received the same it was greatly in excess of what they intended to spend, and was an exorbitant charge. I now hear it has passed into the hands of one of their "Local Architects." The question with me is "what does he know about it?" Cannot I stand in the same position as a grocer or draper—i.e., say, "That is my charge; if you had wanted anything cheaper you should have gone to another shop? I have done a good job and do not intend to take less unless I am legally obliged to accept what you or anyone else thinks is a fair price." No doubt he will want to make it less, to let the building committee see he is of some service to them. Am I safe in saying "I shall not take less: that is my account, and I shall not alter it"? A reply from one who has been in the same fix will oblige.—X. Y. Z.

[5807.]—**Party Walls.**—I would feel much obliged by some kind reader letting me know the following:—I have, suppose, a small house of two stories, and my neighbour's house is three stories high. He wants to re-erect his house, and the wall between has to be rebuilt in consequence. I must add that the wall seems to have been originally built on his ground, and that I have no dues going into it. What proportion of the cost shall I be liable for?—ENOTHEKA.

[5808.]—**Wydraft.**—Can any reader inform me of meaning of this term in legal documents?—J. R. B.

REPLIES.

[5773.]—**Lime.**—It would be very interesting to know where J. S. Goldthorp has learnt that "poor or meagre lime" is the term generally used for hydraulic lime. I quote what Mr. George R. Bunell says in his treatise on "Limes," &c. (Weale's series), and who states that he had consulted and often literally copied from the numerous works. "The limestones containing insoluble silica in the state of sand, magnesia, the oxides of iron and of manganese, in various respective proportions, but limited to between 15 and 30 per cent. of the whole mass yield poor limes," and in another place he says that "the poor limes are those which either do not augment in bulk at all, or only do to a very trifling extent when slaked. They do not harden under water more than the rich limes, and are acted upon by that agent in the same manner, excepting that they leave a small residuum without consistence." And again, respecting eminently hydraulic limes, he says:—"Their change in bulk is invariably as small as that of the poor limes. It is to be observed that all the qualities of lime, whether rich, poor, or hydraulic in any degree, assume indifferently any colour. They may be either white, grey, yellow, buff, or red, without any corresponding change in their quality, as far, at least, as our present knowledge of the art of lime-burning will allow us to assert with any degree of certainty." With respect to rich limes, he says:—"The rich limes are the purest metallic oxides of calcium we possess, and the purest the carbonate of lime from which they are obtained the more distinctly marked are the appearances from which they derive their name. These are that they augment in volume to twice their usual bulk, or even more than that when slaked in the usual manner. If employed by themselves without any admixture of substances, their consistency, even after many years of immersion, is the same as on the first day. If exposed to pure water frequently renewed, the very last particle would be taken up in solution by the water." Then with respect to the arbitrary terms rich or fat as the reverse of poor, I shall quote the translation given in the *Civil Engineer and Architects' Journal* of General Treussart's definitions. "For a long time those limes which had the property of hardening in water were called meagre limes, and those which had not this property were called fat limes. These denominations were given because the first increased but little in bulk when made into paste, while the other gave considerable augmentation of volume, and because fat limes formed with the same quantity of sand a much fatter and more unctuous mortar than meagre lime." And he goes on to say "but the denomination meagre lime is altogether improper to indicate limes which enjoy the property of hardening under water, because there are limes which augment their volume very little on being made into paste, and at the same time possess no hydraulic property," and when "J. S." shall have read this I think he will see that he was mistaken, but if he should not so consider, I do not think that anything would convince him of a mistake on his part.—HENRY AMBROSE.

[5775.]—**Heating Kilm.**—The apparatus referred to by me was fixed by Heurne and Co., Liverpool, and "H. D. H." will be able, I have no doubt, to get the cost from them. The one I saw would suit "H. D. H." well, and would be just the thing for the purpose he names. The pipes are on the floor, and the heat would rise through the racks and frames and throughout the room. The heat, 110°, would be easily obtained and maintained. I cannot say cost of fuel per day, but there is a saving, I am told, as compared with steam, &c. Care should be taken in fixing room to see the heat does not escape. All walls should be well covered.—J. A. BUCK.

[5787.]—**Strains on Collar Beam Roofs.**—Henry Ambrose is thanked for his reply. To treat the weights, however, acting on the rafter as concentrated at the plate and apex, when in the case put it would really be distri-

luted along the rafter, seems unlikely to give a true result. Would it not be better to consider the weight on rafter as acting through its centre or centres of gravity? The method proposed shows a tensile strain only on the collar, and no doubt that is true when the collar is so low on the rafters as practically to connect their feet; but when the collar is placed higher on the rafter there is certainly another force brought into action upon it—namely, that of thrust, for it then becomes a strut between the rafters and tends to prevent them from bending under their load. I am inclined to think that to get the nearest approximation to the truth, the best method would be to consider that the weight borne by so much of the rafter as is above the collar is held in equilibrium by the collar, and then to consider that upper triangle of the roof as a weight to be supported by two inclined struts—i.e., the lower parts of the rafters abutting on the wall-plates. The strains on the upper parts of rafters and on the collar itself could be determined separately: the result would give a tensile strain on the collar. In the second part of the investigation the weight of the upper triangle of roof acting on the upper ends of the inclined struts would develop a thrust along the collar, equal and opposite to the thrust tending to separate the walls. The difference between this thrust along the collar and the tension exerted along the same member by the weight above the collar would seem to give the true strain upon it—at least, that is my present view of it. I shall be glad if "H. A." or any other correspondent will help to further elucidate this problem.—S.

[5794].—**Timber.**—Laslett's "Timber and Timber Trees" is a good work on the subject. I do not know the publisher's name.—G. H. G.

[5801].—**Cellar.**—Apply asphalt to the bottom and, say, 2ft. 6in. up the sides. Claridge's asphalt is considered the best for such a purpose.—SHEEVE.

[5803].—**Proportion in Church Architecture.**—R. W. Billing's work on "Geometric Proportions" is one of the best treatises. See also Chantrell's paper on the "Geometric System" in the *Transactions of the R.I.B.A.* "Perplexed Student" would find the subject treated of in Gwilt's "Encyclopedia." The proportion of nave is different in many instances; a good proportion is 3 to 3½ times the width. With respect to the height, a proportion of 3 squares to the plate is pleasing, the square being measured upon the distance between the centres of two piers. The best method is to divide the plate into squares or circles, and to proportion the lengths and heights upon these. The equilateral triangle was often used in proportioning the plans and sections of our churches, though some architects have no other rule than their own fancy, or some "rule of thumb."—G. H. G.

STATUES, MEMORIALS, &c.

KILMARNOCK.—Mr. W. G. Stevenson, Edinburgh, has just completed, in Silician marble, the statue of Burns, intended to form the central feature of the Kilmarnock monument. The figure is poised on the right leg, the left being slightly advanced. The left hand grasps a note-book, resting on a broken stump, near the root of which a daisy nestles; and the right holds a pencil. In the head, as well as the costume, the well-known Nasmyth portrait has been closely followed. Standing, with its base about 9ft. high, the statue is to be placed on a pedestal, 4ft. in height, within a sort of shrine, having an open pointed arch in front and at either side, through which a full view of the figure will be obtained. This structure forms part of a building in reddish freestone, rising from a terrace approached by flights of steps on an elevated part of the Kay Park. Its interior will be appropriated partly as a keeper's house, partly as a museum for the reception of Burns' relics. The whole cost of the work is, we understand, about £3,000, of which £800 is the price of the statue.

WATER SUPPLY AND SANITARY MATTERS.

NAFFERTON.—A discussion occurred at the last meeting of the Duffield rural sanitary authority with reference to the construction of drainage works at Nafferton. The work was completed about twelve months since, at a cost of £1,200, Messrs. Clark and Pickwell, of Hull, being the engineers, and Mr. B. Roberts, of Lowmoor, Bradford, the contractor. A few weeks ago one of the principal ratepayers wrote to the Local Government Board, complaining that the scheme was almost a total failure. At the meeting of the authorities a letter from the engineers was read, stating that they had examined the works and found that in nearly every case the work was faulty in construction. They laid the entire blame on the clerk of works, who was appointed by the authority, and recommended that a long length of the main drain should be taken up and relaid. This they would do for £10, provided they were allowed to send their own men to do it. The offer was accepted.

THE SEWERING OF ST. ANNE'S-ON-THE-SEA.—A meeting of ratepayers of St. Anne's-on-the-Sea was held on Saturday week, for the purpose of considering a scheme for sewerage of the district, which had been prepared by Messrs. Maxwell and Tuke, architects, of Bury, Lancashire. Mr. Maxwell, the architect of the town, referred to the present unsatisfactory drainage, to the difficulties caused by the flat site of the town, and to the danger of fouling the shore and so preventing bathing. He explained that he should recommend the adoption of

Isaac Shone's pneumatic system, and that the town should be divided into seven sections, in each of which the sewage would be conveyed to a centre and lifted by Shone's ejector into an hermetically sealed pipe, and forced along that pipe to any place suggested by the authorities. By this division of the district the sewers need only be 7ft. or 8ft. deep, instead of from 17ft. to 18ft. He estimated the cost at £2,500. After some discussion, and the hearing of statements by Mr. Isaac Shone, the inventor of the pneumatic system, a committee was formed to make inquiries into its working, and to report thereon.

THE FLOODS IN SOUTH-EAST NORFOLK.—Sir John Hawkshaw, C.E., has examined the flooded districts about Yarmouth and Lowestoft, lying adjacent to the Yare, the Bure, and the Waveney, and has presented a preliminary report embodying the remedies which suggest themselves to him. The district drained by the three rivers which discharge their waters by one common outlet into Yarmouth Harbour has an area of about 1,200 square miles. The lowlands in the district with which the report deals occupy an area of about 68,000 acres. The greater part of these lands lie along the tidal parts of the rivers, but considerable tracts above the tidal districts are also liable to be flooded. The tide flows up the Yare 29 miles, the Waveney 27 miles, and the Bure 25 miles. The surface fall of the rivers is only about 2in. per mile. The report states that if floods are to be prevented the river channels must be enlarged and additional sluices and weirs provided. An obvious improvement, the report continues, might at once be effected and at no great cost, by discharging a part of the flood-waters of the Waveney into the sea through Lake Lothing, at Lowestoft.

THE DRAINAGE OF SOMERTON.—At the Bristol Assizes in February, Mrs. Rachel Bissett, widow, sued the Guardians of the Langport Union for £415, balance of account alleged to be due to her, on a contract for the drainage of Somerton entered into and partly executed by her husband, and finished by herself as executrix, with the consent of the guardians, who were acting as the sanitary authority of the parish of Somerton. The defendants denied that anything was due, and pleaded that the contract under which the work was alleged to have been done was not complied with; they also set up a counter claim, by which they said the work was not done in a workmanlike manner, and within the specified time. By consent of both parties to the suit, a verdict was founded for the plaintiff on her claim, and for the defendants on their counter-claim, subject to a reference to Mr. A. J. Mackay, barrister, as arbitrator, who has now made his award. He directs the verdict entered for the plaintiff to be set aside, and instead thereof a verdict entered for the defendants, the verdict entered for the defendants on their counter claim to stand. He adjudges that the defendants have sustained damages in respect to the matters alleged against the plaintiff in the counter-claim to the amount of £103 4s. 10d., and orders the plaintiff to pay that sum, and all costs of the action and of reference.

LEGAL INTELLIGENCE.

AN ARCHITECT'S CHARGES.—"No Defence?—ABUSE PLAINTIFF."—At the Ashton county-court, on Thursday, an action was heard, John Joseph Butcher against Thomas Jones.—In August, 1877, defendant (a retired grocer) purchased a plot of land on the Dukinfield estate, at the Lakes, and applied to plaintiff, an architect in the town, to prepare plans for building two houses, the cost of which was not to exceed £600. Plans were drawn, and approved by the local authorities, the charge for which was 1½ per cent. on the £600. Afterwards defendant requested him to make out quantities, and this was done at a charge of 2½ per cent. Then defendant decided to have five houses built on the land instead of two, these five to be cellared, and the charge for the altered plans to be £2 per house. The plaintiff was requested to write letters to contractors instead of advertising for tenders, for which a charge of 10s. was made. In all plaintiff claimed £33. He had received 30s. on account, but the plans and specifications had been made no use of, and defendant refused to make payment; he alleged losses by limited liability companies, and had told plaintiff to get it the best way he could.—Mr. J. S. Eaton, architect, Ashton, deposed that the charges were fair and reasonable. For the defence, defendant's solicitor characterised this action as a gross attempt, by a manufactured account, to extort money from plaintiff. The latter had forced himself upon defendant (to whom he was then a stranger), and said he had heard that defendant had purchased some land for building purposes, and begged to be allowed to draw the plans. Defendant said he wanted the houses similar to two in Downsap-lane, which they went to inspect. Plaintiff agreed to draw the plans for 30s., which he had been paid. Whatever else complainant did

as to making out specifications, &c., was entirely without authority, and the statement as to other arrangements were untrue.—Defendant himself was put in the box, and positively swore to what his advocate had stated. He did not consider he owed plaintiff anything. He had given up the land in December last, and had never been asked for payment till quite recently.—Plaintiff's counsel said defendant ought to be sent to Salford sessions to be tried for perjury.—His Honour said it was really an undefended action, and gave judgment for plaintiff, with costs.

QUANTITIES.—Tomlinson v. Adamson and Sons.—This case, tried at the Brentford County Court, on Thursday, May 29th, before Mr. Serjeant Wheeler, was a claim for £14 5s., being 2½ per cent. for working out quantities relative to certain buildings to be erected for a Mr. Charles Bonn, and which the defendant tendered to build, and in which tender the plaintiff's claim was included as usual in all tenders, and which claim according to the custom of the profession should have been paid to the defendant on the first instalment paid by Mr. Bonn to the defendant; but defendant had not paid plaintiff, although Mr. Bonn had paid defendant over and above the contract price. His Honour, after hearing the evidence and arguments of the legal gentlemen engaged, came to the conclusion that beyond a doubt plaintiff had done the work and ought to be paid, but as there was no priority of contract between the plaintiff and defendant, Mr. Bonn, the client, must pay the plaintiff and recover that sum from the defendant, that is, if the amount in question was included in the tender by the defendant. His Honour allowed the plaintiff to withdraw from the case and receive back his hearing fee.

CHIPS.

The Heaton portion of the new Armstrong Park, at Newcastle-on-Tyne, was opened to the public on Wednesday week. The area of this section of the park is 23½ acres; it is 1½ miles from Newcastle town-hall, and is surrounded within 2,000 yards' radius by a population of 30,700. The whole of the works involved in laying out the park, which have cost nearly £2,000, are from the designs of Mr. A. M. Fowler, borough engineer, and the construction of roads, which has been done by day-work during the winter and spring, has been superintended by Mr. Fulton. The lodge has been let by contract to Mr. R. Hardbottle for £400, and is nearly completed.

In a convocation held at Oxford University on Tuesday week, it was unanimously resolved to accept with thanks an offer made by a Fellow of All Soul's College, to give the sum of £300 yearly for three years for the foundation of a travelling studentship for the prosecution of archaeological research, and a board was appointed to elect a student.

Mr. Kendal and Mr. Hare have, as is known, taken the St. James's Theatre, the interior of which has been entirely altered. When they inspected their property they discovered only one defect in it—the intelligent architect had forgotten the staircase. This seems to be a habit with architects. The same mistake was made in Montague House, the town residence of the Duke of Buccleuch.—*Truth.*

A new Wesleyan chapel at Whingate, Armley, was opened last week. The chapel has been built of brick, with a stone front, and will accommodate 400 people, at a cost of £3,200. The architect was Mr. John Simpson, of Cebourg-street, Leeds.

The Wigton Local Board considered and approved at their last meeting plans prepared by Mr. Hodgson, C.E., of Hexham, for the sewerage of the town and sewage purification. The scheme is designed on the separate system, and the outfall works are in a field at Long Tarn, two miles north of the town. The estimated cost is £5,000, to which must be added £430 for a small district above the town limits.

The parish church of Euxton, near Preston, an interesting structure built about 1513, was reopened on Wednesday week after restoration. New flooring has been laid throughout; the pews have been replaced by open benches; the chancel has been raised and roofed, and a new Communion-table placed within it. The outlay has been about £400.

A Local Government Board inquiry was held at Twickenham on Wednesday week, before Major Hector Tulloch, C.E., inspector, with reference to an application from the local board for sanction to borrow £5,000 for purposes of sewerage.

The Archbishop of York, last week, reopened, after complete restoration, the parish church of Menckton. Mr. J. Fowler, F.R.I.B.A., of Louth, was the architect, and Messrs. Keswick and Sons, York, the contractors.

The Cambridge Improvement Commissioners have accepted the tender of Mr. Ulwin for construction of sewers in Sturton-town.

Our Office Table.

THE eminent German historical painter, Johann von Schrandolph, died at Munich on the 31st of May. He was born in 1808, and was originally intended for the trade of a joiner; but, having taught himself the elements of drawing and painting, he obtained admission in 1825 into the Munich Academy of Arts, where he was instructed by Schlothauer in all the details of his art. He practised fresco-painting under Cornelius and subsequently assisted H. Hess in the frescoes at the Church of All Saints and the new Basilica of St. Boniface. He was one of the draughtsmen who composed the cartoons for the painted windows in the Auer Church, near Munich, and in the Cathedral of Ratisbon. In 1844 King Louis gave him the important commission to paint in fresco the Cathedral at Speier, and this occupied him for nine years. He also painted several altar-pieces in which deep and tender religious feeling is combined with great simplicity and nobility of conception and thoroughness of execution. His "Ascension of Christ" in the new Pinakothek in Munich, and his "Nativity of the Saviour" in the Maximilianeum are great works.

A NOVEL method of ventilation is ascribed to Dr. John Swinburne, of Albany, formerly Health Officer of the Port of New York, and has been applied to the Children's Hospital at Albany. The method consists simply in having large window-spaces, and filling nearly two-thirds of each with properly-arranged frames, on which is fastened ordinary, rather thin, unbleached muslin. The frames are so arranged as to slide, and when it is very cold three thicknesses of cotton cloth, two or three inches apart, can be brought into the window-space. The wards run east and west, and are fully exposed to the north, north-east, and east winds, and partially to the north-west. The rains beat on the cloth. One-third of each window is occupied by glass. It is said that the temperature in the wards is easily regulated, and that the quality of the air is always good.

On Saturday the President of the London Commissioners for the Sydney Exhibition attended at South Kensington Museum to pass the last of the pictures going out from England for the Fine Art Department of the Sydney Exhibition. A very valuable representative collection of 300 of the works of English artists has been secured, and such as it is quite safe to say was never seen before in any of the Australian colonies. Sir Frederick Leighton, Mr. Calderon, Mr. Elmore, Mr. Ansdell, Sir J. Gilbert, Mr. Prinsep, Mr. Watts, Mr. Poole, Mr. Alma Tadema, Mr. John Brett, Mr. Horsley, Mr. Armage, Mr. Sidney Cooper, Mr. Cooke, Mr. Storey, Mr. Cripp, Mr. Lehmann, Miss Montalba, Mr. Chevalier, and Mr. Haag are among the artists represented. Mr. Woolner, whose statue of Captain Cook already overlooks Sydney Harbour, has sent two or three pieces of sculpture. Mr. E. M. Barry, Mr. C. Barry, Mr. Wyatt, and Mr. Severn, contribute architectural drawings. The insurance value of the English pictures alone, calculated upon premiums paid by the Commission, exceeds £30,000; and there are 500 other pictures going from other countries of Europe. The miscellaneous collections include good collections of glass, china, porcelain, agricultural implements, and educational appliances and books.

THE decease of the well-known naturalist and archaeologist, Mr. Henry Noel Humphreys, occurred at the close of last week at his residence in Westbourne-square, Hyde Park, at an age not far short of 70. A son of the late Mr. James Humphreys, of Birmingham, he was born in the Midland metropolis in 1809 or the following year, and received his early education at King Edward's School, Birmingham. Among his most important works of an archaeological character between this date and 1856 may be specified "Illustrations of Froissart's Chronicles," "The Parables of Our Lord Illustrated," "The Coins of England," "Ancient Coins and Medals," "The Illuminated Books of the Mediæval Period," the "Coin Collector's Manual," the "Coinage of the British Empire," "Stories by an Archaeologist," and especially "The Art of Illumination," and "The History of the Art of Writing from the Hieroglyphic Period down to the Introduction of Alphabets."

A NEW ventilator called the "Empress," recently patented by Messrs. Ewart and Son, of the Euston-road, aims at a combination of two important principles. In the first place, by means of an Archimedean screw revolving within the tube a strong up-current is constantly produced, and secondly by the patented arrangement of the cone inside the wind fans, an additional up-current is insured and all possibility of downblow prevented. The obvious advantages of this combination are certainty of action at all times and an economy of weight and friction in the moving parts which is very desirable. One peculiarity which strongly recommends the new ventilator is that should it from any cause become fixed it does not become useless, but the principle of the fixed cone comes at once more powerfully into action, producing an up-current which the inventors state is equal in power to that of any known stationary ventilator yet introduced. The ventilator will be shown in action at the Kilburn Agricultural Show next week (Stand 36), and visitors interested in ventilation should make a point of inspecting it.

STAMFORD HOUSE, South Lambeth-road, a well-known old South London mansion, is, according to the *South London Press*, about to be demolished. Stamford House has, in addition to many fine old rooms, some interesting associations. Here Tradescant, the founder of the Ashmolean Museum, once lived, and next to the house was the famous Physic garden of the Tradescants, father and son both being eminent botanists and naturalists. The house has been purchased by Mr. F. Snelling, of Lansfield House, South Lambeth-road, for £2,650, and will be soon numbered with the past. Mr. Snelling is the iconoclast of South Lambeth, for this is the eighth old mansion he has bought and pulled down. This process is termed "improving" the locality. It may be so, but to one who in vain looks for the old spots he once knew and loved so well, and who now finds nought but staring bricks and mortar, painful to look at in their newness, the removal of these landmarks is a source of uneasiness.

WE stated some weeks back, in our notice of the new Art Union Buildings in the Strand, that the scagliola marble columns and pilasters had been placed in the hands of Messrs. Bellman and Ivey by Prof. E. M. Barry, R.A. They are now fixed, although not polished. The entrance-hall is enriched with Genoa-green and red Devonshire, and the first floor with Brocatella columns and pilasters. Mr. Barry has expressed himself as being much pleased with the work.

MESSRS. F. J. AND H. FRANCIS, the architects of the Grand Hotel, Charing Cross, have instructed Messrs. Bellman and Ivey to proceed with 22 scagliola marble columns for the grand salle; these will all surround iron columns, and will be fixed without showing joint.

THE annual meeting of the Royal Archaeological Institute will be held at Taunton in August next, from the 5th to the 12th inclusive. The official programme shows that on Tuesday, the 5th, the Mayor and Corporation of Taunton will receive the institute at an inaugural meeting, at which the President's address will be delivered, and afterwards the Institute will be the guests of the Corporation at a public luncheon. During the afternoon the visitors will go over Taunton Castle and the magnificent Late Church of St. Mary Magdalene, and afterwards inspect the various objects of interest in the town. The sectional meetings will commence at eight in the evening. On Wednesday there will be an excursion by rail to Cleve Abbey, of recent years made familiar to students by the painstaking researches of the late Edmund Sharpe and the Rev. MacKenzie Walcott, and from thence to Dunster Castle where a reception will take place, a conversation being given in the evening at Taunton Castle Hall by the Royal Archaeological Institute. On Thursday, the 7th, the annual meeting of the Institute will be held, and in the afternoon there will be excursions by carriage to Staple Fitzpaine and Castle Meroche. On Friday, the 8th, there will be an excursion to Bridgwater, Cannington, Stoke Courcy, and Fairfield, where a reception will be given by Sir A. A. Hood; afterwards a visit will be paid to St. Audries, thence home by rail. On Saturday, the 9th, there will be an excursion to Langport and Muchelney Abbey; having been received at Montacute House the members will visit Hambdon-hill, Stoke-sub-Hambdon Church,

Barrington Court, and Ilminster. On Monday, the 11th, an excursion will be made to Wells, where there will be a reception at the Palace, and to Glastonbury Abbey. Sectional meetings will be held in the evening, and on the following morning and evening. In the afternoon of Saturday there will be a closing excursion by carriage to Morton Fitzwarren, Bishop's Lydeard, Cothelstone, and Kingston. From this brief summary it will be seen that the district comprised in this year's excursion of the Institute is one rich in remains of monastic institutions, and containing several feudal castles, and some of the finest specimens extant of Perpendicular church architecture.

At Carpenters' Hall, London-wall, the porphyry columns, &c., in outer hall, and others of verde-antique, in the inner hall, with polished Parian capitals, are now being fixed. At a recent meeting the company and their architect (Mr. W. W. Pocock) approved of specimens for columns in the livery-hall, and Messrs. Bellman and Ivey have since received the order for same. They are in paonezzetta, with enriched Corinthian capitals, 19ft. 9in. high by 2ft. dia., and are made in one piece, without joint.

HAVING in view the domestic dangers to health arising from imperfect workmanship by plumbers and the use of improper so-called "sanitary appliances," the Council of the National Health Society have taken into consideration the most practical means of striking at the root of these serious evils. The conviction that a want of knowledge by working men of the elementary laws and application of the laws of sanitary science is a chief cause of these defects has led the committee to the conclusion that great good to the community would ensue from the practical teaching of elementary sanitary science to workmen actually engaged in building our houses. The Society proposes to organise a series of lectures and demonstrations to working plumbers. At the close of each series of lectures handsome money prizes would be awarded to those who gave the best evidence of having profited by the teaching. The National Health Society believe that not only would the lectures be very numerously attended, but that the matter will become one of general discussion in the workshops, and appeal to architects, builders, and the public generally for funds towards their proposed undertaking.

THE Home Secretary will be influentially supported on June 28th, when opening the Parkes Museum of Hygiene. Among others who will be present we may mention Viscount Cranbrook, Earl Fortescue, Sir Thos. Watson, Prof. Huxley, and the Mayors of Cambridge, Southampton, Salford, and Welshpool. The museum comprises an area of 3,500 square feet, independent of the library. This space will be quite filled by the day of opening, and the progress made during the past few weeks justify the assumption that the committee will succeed in making the museum a national institution of no mean importance. Communications may be addressed to the curator, Mr. Mark H. Judge, University College, London, W.C.

Glaser's Annalen contains a description of an improved method and apparatus for the manufacture of artificial sandstone. A thorough mixture of four to six parts of fine sand and one part of slaked lime is exposed for about three days to a high temperature and a pressure of more than three atmospheres, causing the formation of a silicate of lime which acts as a cement, so that the mass, when cooled down to the ordinary temperature, hardens. This hardening process continues for some weeks by exposure to the air, so that finally a product is obtained which is as hard and solid as good sandstone. The apparatus consists of a tank, into which the mixture is filled, and in which it is heated and stirred by a steam pipe, provided with a number of arms and rotated by belting or gearing. After the mixture has reached the proper temperature the steam is cut off, and a second vessel, inclosing the tank on all sides, is put into communication with the boiler. By this means the mass is heated for the period necessary. It is then run into a brick machine and shaped into the forms required. The process, it is claimed, effects great economy, especially for the manufacture of window-sills, &c. The apparatus used is made large enough to produce 250 cubic feet of material in every charge,—requiring, generally, three to four days.

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CHIPS.

The mission church of All Saints, in Blenheim-road, Ipswich, was reopened on Sunday week, after enlargement, from the designs of Mr. E. F. Bisschopp, of that town, the architect of the original structure. A western extension of 21ft., upon which is a bell-turret, affords 100 additional sittings, and a north transept 60 more, raising the accommodation to 370 seats. The additions correspond with the main structure, and are in red brick with handsand dressings of coloured brick and tile roofs. Mr. Coe, of Brooks-hall-road, Ipswich, was the contractor, and the total outlay for additions and new organ, built by Messrs. Godball, has been £515.

New schools are about to be erected for the Carlisle School Board in Denton-holme, from the designs of their architect, Mr. Birkett.

The annual excursion of the Kent Archaeological Society will take place on July 30th and 31st, and the meeting will be at New Romney.

The Exmouth Local Board, having applied to the Local Government Board for authority to borrow £1,200 for carrying out improvements within the district, a local inquiry was held on Thursday in last week before Col. Ponsonby Cox, C.E., one of the Board's inspectors. The surveyor, Mr. Packham, gave evidence showing that the money was required for asphaltting a path running parallel with the sea-wall and for street improvements spread over the greater part of the district.

At Penzance a Bible Christian chapel, erected at a cost of £2,000, has just been opened. It seats 500 persons, and there are a schoolroom at the rear and vestries beneath the main building.

Cwmbrwla Chapel, Swansea, was reopened on Sunday week after enlargement and the addition at the rear of a schoolroom and classroom. The architect is Mr. George Hauman, of Swansea, and the builder Mr. David Evans, of Brynhyfrydd, near Swansea. The outlay has been about £1,700.

Mr. J. Lawton Webster has been elected surveyor and inspector of buildings to the Malton local board.

The town council of Bradford received at their last meeting a report as to the falling in of about 120 yards of the main sewer in Shipley Valley in consequence of an insecure foundation, and ordered the same to be reconstructed at an estimated cost of £3,040.

On Wednesday week Mr. Arnold Taylor, C.E., held an inquiry on behalf of the Local Government Board at Heckmondwike respecting an application by the Local Board of Health for sanction to borrow £2,000 for providing a refuse destructor and for works and premises connected therewith.

Deep-water docks are to be constructed at Swansea, and the contract has been taken by Mr. T. Walker, of London, at £196,000. At the same port a new railway and other subsidiary works, estimated to cost £33,000, are about to be carried out.

The town council of Scarborough received at their last meeting, a report from the scavenging sub-committee who have visited Liverpool, Leeds, and other towns in order to obtain information as to the disposal of house refuse. They recommended the council to adopt the "destructor" as in use at Leeds for consuming part of the refuse and to convey the remainder out to sea. The report was referred back to the sub-committee with instructions to ascertain the probable cost of carrying out the systems recommended and of conveying out to sea the whole of the refuse.

The lock entrance to the Canal at Severn Quay, Gloucester, was reopened on Thursday, after having been closed for a fortnight to allow of the replacement of the lock-gates. The new ones are of green wood from South America and weigh 15 tons. They were constructed at the company's works at Saul, and were erected under the superintendence of Mr. F. J. Callis, assistant engineer to the company.

The consecration of St. Eidan's Church, Solva, in St. Bride's Bay, was performed on Wednesday week by the Bishop of St. David's. The church is a simple Gothic structure, seating 200 persons. All the fittings, including the seats, are of pitch-pine. The architect is Mr. Pearson, of London, and Messrs. Evans and John were the builders.

New buildings, erected at a cost of £3,500, for a mutual improvement society, were opened at Eastbourne on Thursday in last week by the Duke of Devonshire.

It is announced that the list of applications for shares in the Tramways Company of Germany, Limited, will close on Thursday next, the 26th instant.

A monument to the late Rev. John Roberts, the musician and divine, better known in the Principality as Ieuan Gwyllt, has been publicly unveiled at Caerthraw Cemetry, near Carnarvon. It is of polished Aberdeen granite, and is 16ft. high, and has been erected by contract by Mr. Hastings Sanfield, of Liverpool.

The first train over the new branch line of the London and North Western Railway from Dowlais to Merthyr was run on Monday week.

The Wakefield Corporation have fixed on a site for the proposed large new reservoir at the head of Ryburne Valley, within the parish of Halifax, and have arranged with the owners of property and the manufacturers, millers, and other owners of water rights. They have obtained sanction to borrow £300,000 for the works, to which some opposition is threatened in Halifax.

A stone-dressing apparatus, worked by an electrical machine, has just been invented by Mr. J. G. Cranston, engineer, of Newcastle-on-Tyne. He claims that the machine can be worked automatically or by hand, and that it performs the dressing of mill-stones or other masonry, and will drill rock with rapidity and accuracy.

The burial board of Cardigan, at their last meeting, adopted the plans of Mr. Alfred W. Szlumper, for the laying out of the new cemetery.

Mr. Evan Evans, of Troedyburn, has been appointed highway surveyor to the Llangollen district

In an action brought on Friday in Kingston-on-Thames county-court by a speculative builder against a tenant for a quarter's rent, Judge Lushington said such houses, as a rule, were a pollution to the country and a disgrace to civilisation, but as the defendant was a medical man, and had the premises carefully examined before he took them, there must be a verdict for the plaintiff, though he had no sympathy with him.

On Sunday week the nave of Tewkesbury Abbey was opened for service, having been temporarily fitted up to enable the committee to complete the restoration of the choir and the laying of paving.

The scheme for drainage of the rural sanitary authority of Croydon is now expected, says a local journal, to cost more than £20,000 over what was at first estimated, and the loan of £77,070 obtained. The accepted tender of Messrs. Cooke for the works is £78,228 18s.; a culvert for the river will cost £2,110 13s. 7d.; surveying and engineering, £4,930; and rights of easement, £500. The total cost, including £11,650 for purchase of land, will be about £100,000.

Mr. Johns has been elected district surveyor to the Crickhowell Highway Board, at £80 a year. There were twelve candidates.

At a meeting held at Charfield, Gloucestershire, on Wednesday week, the question was considered whether the existing parish church, at present in a very unsatisfactory state, should be restored and enlarged, or whether a new one should be built nearer the centre of the village, and it was decided to adopt the latter course.

A new Board school in Lothian-road, Edinburgh, is about to be erected. The building, which is to be three stories in height, is in the Domestic Gothic style, and is intended to accommodate 800 children. The cost, exclusive of site and furnishings, will be about £6,000. The designs are by Mr. Wilson, the architect to the Edinburgh School Board.

New Board Schools have just been erected at Ashford, East Kent, from the designs of Mr. Hanson, architect to the School Board. Mr. D. Fowler was the contractor.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. Presentation of Royal gold medal and annual distribution of prizes. 8 p.m.
Aeronautical Society at Society of Arts rooms. Papers and experiments on "Flight." 8 p.m.

Trade News.

WAGES MOVEMENT.

BLACKBURN.—On Saturday the Committee of the operative stonemasons, now on strike, waited on the employers' committee and offered a compromise, undertaking to return to work if the masters will reduce wages 3d. per hour instead of 4d. The matter was brought before the employers at their meeting on Monday, and it was unanimously resolved to abide by the original proposition, to reduce the wages from 8½d. an hour to 8¼d. Late on Monday night the operative masons agreed to accept the masters' terms of 8½d. per hour, 49 hours per week. A further meeting has been since held, and there was a warm discussion, but a great many masons have returned to work.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, JUNE 27, 1879.

THE TURNER DRAWINGS AT THE NATIONAL GALLERY.

WE are glad to find that the authorities of the National Gallery have set apart two large rooms for the exhibition of the Turner drawings and sketches, which have been hitherto inaccessible to public view. An immense number are in the possession of the institution, and those now carefully exhibited in cases will in turn give place to others. Among the coloured sketches of Turner in his later style we may mention a series of views in France, Italy, and Switzerland of remarkable beauty and character. They generally retain their brilliancy of colour—here and there iridescent in hue, though we observe the exposure to light has in some instances been injurious to the pigments, a risk that will be avoided as much as possible by curtains which are made to draw over the easels and frames. As a series of views, few are more charming than the sketches labelled Houlleur, Amiens, Tancarville, Harfleur, Mantes, and Havre. In these a body colour has been used on a grey paper. In the view of Havre, a sketch which has excited the admiration of Ruskin, we find all the characteristic feeling of the great painter. "Between Mantes and Vernon" and "Amiens" are two charming sketches. In the latter (unfinished) the tint of brown is run upon the grey tone of the paper; the houses are roughly sketched in with sepia, while in the distance the cathedral and its spire are faintly discernible in blue. In this, as in others, there is a smudgy effect produced; the colours are mingled together when wet, but have that remarkable brilliant and opaline effect which only Turner could produce. "Jumièges" is a wonderfully characteristic sketch; the lighted abbey in the distance, relieved by the dark masses of shadow and colour, make a charming picture that is well known from its engraving. Many of the originals of the engraved series known as "The Rivers of France" are in the collection. Some of these sketches were made in one of Turner's annual tours, about the period 1825 to 1830. The sketches of Venice, on white paper, are still more glowing and brilliant examples of the great artist's power of light and shade and colour. In these his love of difficult atmospheric effects is marvellously displayed. Take his views of Venice as the "Guidecca looking out to Fusina," and "The Guidecca from the Lagoons." What a power of colour in the sky and water, they appear to blend in the glow of the horizon; the former has been copied literally in the painter's large oil-painting the "Approach to Venice." In the latter, the yellow, red, pink, and green are run together in that misty manner Turner loved to depict; we catch the impression of bright hues, but all detail is sunk in the general effect. In one of these drawings we observe the light fleecy touches of cloud, done in a metallic white pigment, has turned black. Exceedingly brilliant, as sketches, are those illustrative of Swiss scenery. The "Approach to the Splügen Pass" is an unfinished sketch, and, we believe, was the original of the work painted for Ruskin. It gives us a faint, though graphic, ideal of the pass connecting Switzerland with Italy. The receding Alps and the distant sunlit peak, with the tower on the foreground rock, are faithfully represented. Sketches from the

Lake of Zug, and "Venice, Sunset" are glowing bits of colour, the blue and yellow, and the streaks of crimson, and the deep blue distance truly luminous; the "Grand Canal, with the Church of Saluti," is a charmingly delicate sketch on white paper—the merest outline in colour, with the lights of domes left in the white paper. The artist has washed in all the effect with the least amount of colour, and, from a little distance, the sketch has all the completeness of a finished drawing. "Martigny and Chateau" is another rubbed-in effect of mountains and building, the chateau faintly outlined on the mountain side. The two sketches of the Righi from Lucerne are grand impressions, though in different keys; so is "Venice from Fusina," with its clouds of purple and carmine, touched or nibbed in upon a wet ground. We note some fine and very brilliant views of Lucerne, with its grand precipitous scenery, its buildings and castles; also a pair of sketches of Zurich, Coblenz, and Constance. The noblest characteristics of these spots have been focussed in colour, so to speak; it is true we have little detail; Turner leaves us the ideal beauty alone of these classical scenes; we get all the poetry that is possible to be got upon paper—in short they may be called painted poems. The Venetian and Alpine sketches are of recent date, and indicate the latest feeling of the painter, and those who remember the raptures of Ruskin will look at them with intense pleasure as the actual impressions of the scenery upon the artist's mind, and in this sense they possess even more value than the oil copies made from them. Many of these radiant sketches have not taken more than a few minutes; they are vivid impression in colour, indicated by a few touches of the brush, the local tints being put on while the paper was damp, while a few scrawls of the pen dipped in red, sepia, or violet give faint indications of masses of detail and groups of buildings or figures. Here and there we observe body colours applied, but the whole is harmonious and aerial. The handling indicates an impatient grasp of genius ready to generalise the first impressions of nature upon the retina while avoiding all detail; and the effect many of these sketches leaves upon us is that Turner was working in a vehicle not pliant enough for him to manifest the various modifications of light and shade and hue which caught his eye. It is necessary for the visitor to go prepared in the right temper of mind to appreciate what appear to many as unintelligent scrawls and smudges; but before he comes away he will begin to estimate at their true value the work of a man who regarded nature from the true poet's standpoint. His earlier sketches and drawings are no less worthy of study, however, and show that Turner commenced with the conventional idea of drawing. For instance we notice two sketches, one "The Hot Wells, Bristol," a highly-finished drawing; while another, "Folly Bridge, Bacon's Tower, Oxford," signed with the date 1787, shows a crudely drawn water-colour copied from a print, in which the outlines are drawn with the disagreeable distinctness observable in copies by novices. These drawings are particularly interesting as showing the change in the great painter's mode of delineation. Among the earlier works we may draw attention to a beautiful series of vignette designs for illustrations to Rogers's Poems, executed about 1830 to 1834. Some of these are gems of colouring, the detail and intensity of colour increasing to the centre of the picture. The "Ports of England," engraved in mezzotint by Lupton, about fifty years ago, are represented in a few original sketches. Of these, Scarborough, Stangate Creek, Whitby, Portsmouth, and Sheerness must be particularly mentioned as highly-finished water-colour miniatures, in which drawing, composition, and rich colour

are conspicuous. The series of sepia drawings for the Liber Studiorum, executed between the years 1807-1820, are to be seen also upon the walls, and exhibit Turner's early care for detail. Greenwich Hospital from the Hill, Rivaulx Abbey, Holy Island Cathedral, and Kirkstall Crypt are remarkable drawings exhibiting a wonderful power in architectural detail. Thus Holy Island Cathedral might be mistaken for the work of an architectural artist. The Norman pillars and arches are well drawn, and the perspective good. The tower of St. Mary's, Redcliffe, Bristol; York Cathedral, and the tower of Boston, Lincolnshire, are delicately-drawn pencil sketches, in which the outline has been largely filled in with detail—much of it executed with a freedom and feeling the architect would not despise. As a study of light and shade, Ruskin has pointed to a drawing in sepia of the remains of a Doric temple which now hangs over one of the doorways. Turner's earlier sketches of Rome show also a considerable knowledge of architectural detail, which in after years gave place to the broader and more genial branch of landscape in which he became so great a master. For masterly and complex composition, for balance and skilful grouping, in which a kind of ingenious intricacy appears, and especially for breadth and brilliancy of colouring, the studies of Turner at the National Gallery are well worth attention.

BRONZES AND IVORIES AT THE BURLINGTON FINE ARTS CLUB.

WITH some hesitation the committee of the Burlington Fine Arts Club decided to exhibit bronzes this year in their rooms in Saville-row. It would be flattery to say that the collection now brought together approaches in interest those of several former years. Still, no less than 550 articles, mostly of a high class, many of the very highest, have been contributed by members of the club and their friends. Neither in the bronzes nor in the ivories is there anything approaching to a complete historical series. What we really have is a collection of each of the description most fashionable at the present time, namely, Italian work of the 16th and 17th centuries. There are, however, a few Greek and Roman bronzes, chiefly those in Cabinet No. 1, belonging to the Rev. Montague Taylor, who is to be congratulated upon the possession of so many fine things, in number and quality only to be rivalled by the works exhibited by Mr. C. D. E. Fortnum in the same case and in several other parts of the room. No. 11, ornament of a vase, being a mask in bronze, inlaid with silver, the eyes formed of rubies, is a superb specimen of the choicest Græco-Roman work. From this precious fragment we can conceive what must have been the beauty of the complete work. It was found at Pompeii. Somewhat similar in shape, and probably for the same purpose is the handle of a vase (No. 7). This is evidently Roman of about the time of Trajan. The subject is said to represent the Dacian conquest. No. 12 is another fine Roman bronze. It is a statuette of Apollo, still standing upon the original decorated bronze stand. There is an inscription punctured upon the back: "M. Port. Tert. Bel. Aug. Concord." By far the finest antique in the whole collection is the lovely Venus in Case 5, No. 165. She stands nude, and holding a wreath, 13½ in. high. The late Professor Westmacott attributed it to the School of Praxiteles, a conjecture highly probable both on account of its excellence and its having been found in the neighbourhood of the ancient Stratonice in 1811. Praxiteles worked in Caria. No. 76, a figure of a Greek warrior, the right arm and half of the lower limbs wanting, is good, and is covered with a fine green patina. The most important

statue in point of size, as well as for interest and excellence, is David (No. 78). It is supposed to have been executed from the design of Michael Angelo by one of his pupils. The Duke of Westminster shows a fine bust on a bracket by the mantelpiece, the life-sized head of a young girl, of the early part of the 16th century. The Rev. Montague Taylor has many Florentine reproductions from the antique, among which are, No. 17, an elegant figure of Ceres, reduced from the original in the Vatican, much resembling some of the charming coloured terra-cottas discovered in Boeotia; No. 1, a group of Silenus carrying the young Bacchus in his arms. This is said to be a reduction of the fine statue in the Louvre. The original work from which the several antique statues of this subject were copied is believed to have been lately discovered in the excavations which have been going on at Olympia. Of the celebrated Borghese Gladiator of Agasias there are no less than three Italian copies, Nos. 31, 329, and 331; all are good, but by far the largest, oldest, and finest is the last, which belongs to Lord Elcho. The original marble of this is also in the Louvre. Some very fine groups and statuettes are placed upon the tables in the centre of the room. There is a very satisfactory antique bronze of a bull, lent by Mr. Bowyer, finely modelled and very highly finished; and close by a delightful full-length figure of Venus, with her arm upraised, belonging to Mr. Fisher. No. 411, "Hercules and Antæus," after Baccio Bandinelli, is full of vigour and power. Mr. G. Salting is the fortunate possessor of the beautiful group No. 323. Charity, after a design by Beccafumi, is represented by an erect figure supported by two children at her feet, while she carries a third in her arms. The bronze is in every way a most beautiful work. There are several examples either by or after John of Bologna, the crouching Venus, No. 333, being as good as any. It stands on a bracket to the right of cabinet No. 8. We must not omit to mention No. 159, a very fine Hercules raising his club, similar to Sir Richard Wallis' boxwood figure, which has the inscription "Opus Francisci Aurifeis." Bacchus, also, belonging to the Rev. Montague Taylor, on a bracket to the right of cabinet No. 1, should be noticed. There are a few, and only a few, interesting bronzes of sacred subjects. No. 168, St. John the Baptist, is upon somewhat slender grounds attributed to Donatelli; Nos. 161 and 163, St. John the Evangelist and the Blessed Virgin, to Lorenzo Ghiberti, though they seem too coarse and clumsy to be the work of that consummate artist. The crucifix, No. 260, which originally belonged to Cardinal Pandolfini, and was bought for Queen Marie Amelie of France, is a work of extraordinary finish. The last three items in the catalogue are among the best of this kind. Nos. 548 and 550, Melchisedec and the Prophet Malachi, are both signed works of Alessandro Vittorino, and are remarkable for their dignity and the simplicity and correctness of their drapery. No. 519 is a powerful rough casting of a half-finished model of Pluto, holding a trident in his right hand, with the dog Cerberus at his feet; one of the Fontainebleau gods done in silver, by Benvenuto Cellini.

Among works executed for domestic purposes the knockers, saltcellars, and inkstands are the most conspicuous, with the exception of one beautiful bell, lent by Mr. Salting (No. 326). It is only 6½ in. high, but full of the finest work in low relief, of dancing children, with bands of floriated ornament; on the top is a boy playing a tambourine. Nos. 86 and 87, a pair of Sphingi, are finely decorated. The best of the knockers are Nos. 309 and 331. The former was taken from the Grimani Palace at Venice, and is formed of a very bold and well-wrought

mask supported by dolphins. The other, of which there is a replica, exhibited by Mr. T. Shattock, is ornamented by a fine nude figure of Neptune, with a sea-horse on either side, terminating in floriated ornament. The candlesticks (Nos. 169 and 175), lent by Mr. Drury Fortnum, and attributed, without much reason, to Pollajuolo, are excellent examples of the most skilful casting. The ornamentation of No. 169 is as sharp as the finest Wedgwood. No. 175 is simpler, but no less artistic in design and execution. There are many fine inkstands, a most beautiful specimen of which is No. 174, Pan, seated, holding a vase; and in the same case (No. 173), a very wonderful work, formerly in the Bernal collection. Two others (Nos. 164 and 166) are by Peter Viseher, the great Nuremberg bronze-founder, the author of the splendid shrine of St. Sebald, a cast of which may be seen in South Kensington Museum. They are neither of them very important specimens; No. 166 is the better of the two. The number of medals and medallions is very great. To many people the ease containing these smaller works will not have the least interest, containing, as they do, so many well-known portraits. Cabinet No. 6, all belonging to Mr. Drury Fortnum, holds a marvellous collection. In the centre there is the original portrait in wax of Michael Angelo, by Leo Leone. It is an excellent proof of the wonderful pains and care taken by the best Italian artists in perfecting the medals which so surprise us as real marvels of true portraiture. We have here both the medal and model. After this the most interesting things in this case are the plaques which formed the centre of paxes, among which Nos. 189, 190, 196, and 230 are worthy of notice. No. 231, a Virgin and Child, gilt, of the 16th century, is very fine. No. 248 is a portrait of the Saviour, said to have been taken from the emerald vernicle. All the table cases containing portrait medals should be carefully scanned. Both historically and as works of art the contents are of a very high value. Many are by famous artists, such as Pisano, Pasti, Sparadio, and Enzola. In concluding this notice of the bronzes exhibited, we must demur to the statement in page 6 of the preface to the catalogue, that we possess no works in bronze of the date of the finest period of ivory carving. The latter work, usually gilt, of the 12th to 16th century, is quite as good as the ivories of the same period, as for instance the splendid tombs in Westminster Abbey, the candelabra at Venice, the hundreds of fine monastic seals, lecterns, and other articles of church furniture *ad infinitum*.

The ivories would have been more generally interesting if they had been better arranged and classified, and more correctly described. The oldest is an Egyptian head, No. 290, of very archaic and somewhat tame character. No other example earlier than the 13th century A.D. is exhibited, except the plaque, 11th or 12th century, No. 266, on which is represented our Lord in the act of benediction with the four evangelist symbols at the corners, surrounded by the usual semi-Classical ornamentation; and Mr. John Malcolm's beautiful Hispano-Moresque box; which is covered with the usual interlacing foliation, and has a truly Oriental inscription round the edges in Cufic letters, in praise of its own beauty. The same gentleman contributes several other leaves of diptychs and triptychs of high quality. No. 281 is a diptych, with the life of Christ in six compartments under handsome canopies—some containing two subjects, as the Betrayal, and subsequent suicide of Judas. There is more life and spirit in parts than we usually meet with. No. 274, a leaf of a diptych represents the death of the Virgin, in three compartments. The lowest gives the chamber of death, with the apostles showing violent signs of grief; in the middle she is

being carried up to heaven by angels; while one on each side carries a candlestick, others are censuring and playing instruments of music; at the top is her Son carrying her soul, like a little child, in His arms, the heavenly host standing round with harps and other instruments in their hands. The finest specimen of Gothic ivory in the room also belongs to Mr. John Malcolm. No. 282 is a wonderfully fine leaf of a diptych, 9½ in. by 5½ in., alike important for size, execution, and condition. It still, fortunately, retains the delicate original decoration in gold and subdued colour. The Rev. J. C. Jackson, among other interesting things, has sent a very pretty polyptych of five leaves. On the outer shutters are prophets and Saints. The centre tabernacle, divided into two compartments, has Christ in Majesty at the top, and the Virgin supported by angels in the lower one. The terminal piece of a rosary (No. 287), of Early 16th Century German work, is a remarkable instance of realistic treatment. Mr. Fisher has lent a perfect rosary (No. 337), with a somewhat similar ending to it. The description given is that there are three faces, Our Lord's, that of the Madonna, and of Death. We think by comparison with No. 286 that the lady's head is that of the wearer, a *memento mori*; that No. 287, in fact, belonged to a man; Nos. 286 and 337 to ladies. The collection of Mr. P. C. Hardwick contains examples worthy of high praise, from the 13th to the 18th century. No. 94 is a good ceremonial comb, French, of the 15th Century, with religious subjects. The Virgin and child crowned (No. 100) is signed Bianchi and dated 1507. It is seldom we are so fortunate as to meet with dated or inscribed ivories. There is great grace and elegance in this beautiful figure. The drapery is singularly bold and simple. Of later work, in the style of Fiamingo, we have a plaque (No. 103), with a tiger drawing the infant Bacchus, surrounded by baby bacchanals. No. 110 is one of the best Italian 17th Century works. It is called Mars, Venus, and Cupid, but more probably represents Hercules and Omphale; the feeling is distinctly Roman. The perfection of rococo treatment is shown in the statuette of Prometheus of the 18th century. The exhibition is richest in the works by and attributed to Fiamingo and his school. No. 113, a cast of the splendid Bacchanalian subject by him at Madrid, shows how impossible it is to accept the authenticity of many works, even in these rooms, to which his name is attached. It is exhibited by Mr. Alfred Morrison, who also sends No. 296, the model in wax of Silenus on his ass with the attendant train of bacchanals. Cabinet No. 2 contains some of the most interesting examples of this kind. No. 67, a sleeping boy, from the collection of the late Mr. G. Field, is an undoubted Fiamingo. Two groups of boys, holding garlands of flowers and seated on roots of trees, 17th or 18th century, are very charming. There are several fine tankards in this case. Sir Julian Goldsmid's statuette of Venus castigating Cupid (No. 361) is capital; his plaque (No. 354), boys with goat, is a fine specimen of Fiamingo's work. Mr. John Malcolm's comb (No. 371), sculptured all over in low relief with the Massacre of the Innocents, is a work of high excellence. In No. 370 we have a faithful and skilful translation of a print by Hans Sebald Beham of the "Rape of Helen." Perhaps the most important ivory in the case is the "Triumph of Death," 15th century Florentine work, reminding one of the earlier tapestries at Hampton Court; the tumbler of death, drawn by two solemn oxen, is levelled all alike, from the Pope to the peasant girl. The execution is in low relief, highly foreshortened; it is a very characteristic work. We thought that it was an established fact that the articles such as Nos. 378 and 379 were not nutmeg-graters as de-

scribed, but Rappee snuff-graters. In the first place the receptacles at the end are not large enough to take a nutmeg, and in later examples there is no separate place for what had to be grated, only a certain amount of room between the lid and grater, probably to hold a slab of compressed tobacco (Cavendish). We have a fine example before us in damascened steel, belonging to some French marquis of about the date 1730 or so, which has an inscription to the effect "Take a pinch. It is good." There is scarcely a doubt that these ivories were the original snuff grinders. It is curious what good work was bestowed upon these implements, whatever was their use, as may be seen in Nos. 378, 379, and others.

The whole collection, both of bronzes and ivories, is full of interest, but we wish that either the one or the other had been more fully illustrated; of ivories, at any rate, there is no lack in the country, if the possessors were only sought out.

BUILDING LEASES AND THEIR EFFECTS.

WE have before now deplored the effect of leasehold tenure on the houses in our suburban districts, and the injury it inflicts upon honest building activity. It is impossible to shut one's eyes to the needless and ceaseless appropriation of land round London and our great towns by the speculative builder, to the detriment of all good building, the ruin and degradation of intelligent labour, and the debasement of art generally. The same result stares us in the face everywhere. As we have repeatedly urged, the public not only pays but suffers; and the extent of the mischief is spreading—not merely robbing us of our green fields, but depriving us of comfortable houses, and grieving our eyes with a hideous travestie of architecture divested of every true sentiment and feeling. In elucidation of this subject an able article recently appeared in the *British Quarterly Review*, which is now reprinted under the title of the "Ethics of Urban Leaseholds." If we cannot endorse every opinion expressed, the author has our good wishes in the cause he has espoused. If ever people are to be driven out of the suburbs of London, it will be by that continual aggression of the speculative builder which is defrauding the citizen of every spare acre of land that has a tree or a bit of herbage upon it.

Nothing can be more insufferable than the filling up with piles of dreadful brickwork every available piece of ground that the cupidity of freeholders or their lessees can turn into account. When we turn for a moment from the unendurable monotony of the localities thus given over to the greed of ground-landlords and lessees, to the process by which freeholds are converted into leasehold tenure, the system is still more pernicious. As the *Quarterly Reviewer* aptly observes, "leaseholds are eviscerated freeholds stuffed with law." Land soon became a rich harvest for the lawyer's cleverest devices. As soon as a freeholder found his land developed into building land he was prompted to turn it into account. A lawyer, and generally an architect, are concerned in the little business. They persuade him to develop still further its capabilities, they lay a plan before him, draw up leases, and pocket their fees. "Meanwhile," as the author observes, "the lawyers and the architects are realising what the man of property can only make his hope; they plan and litigate, as leaseholds need, and get their costs. The sewers and roads are also made at a large outlay, bringing no immediate return, but yielding a commission to the architect, and then the property is quiet for some years. At length a plot of land is let to a smart, enterprising builder, highly recom-

mended by his timber merchant; and to induce the builder to proceed with spirit and secure the ground-rents, liberal cash advances from the fortunate proprietor are suggested, and eventually made. The architect will certify the cost of building work to warrant each advance, and the solicitor will take the builder's equitable security and his receipt, the fees remaining with the architect and lawyer as before. The freeholder is once more good for all, but gets no gain. The work, however, does proceed with spirit. Possibly a dozen "carcasses" are soon in a condition for the first advance, and so they rapidly proceed till all are covered in; and then the builder, having gained his stipulated cash advance upon the maximum of rough material, to be paid for when his three months' bills are honoured, and on the minimum of costly labour which he has to pay for promptly in days' wages, can with cheerfulness look round him, and his friendly timber merchant being paid, he offers—and a liberal offer too—his general creditors 5s. in the pound. The creditors who know their business acquiesce, and, pocketing their dividends, are quite prepared to trade with the same enterprising builder on some other 'freehold property,' where 'cash advances will be made.'" The story, as far as it goes, is the old one; but the worst has yet to come. The work stops. The creditors of this class of builders do not lose; they insure themselves against the risk by extravagant prices, by giving large discounts varying from 20 to 50 per cent. But the freeholder is often less fortunate. His hopes of wealth are prematurely shattered, and he finds, to his dismay, that his land is only covered by half-finished houses, which have either to be finished or sold for what they will fetch. A great reduction upon the former rental is the result; "advances" are made more cautiously, or not at all; or, as in most cases, the ground rents are sold as fast as they are realised. In numerous instances the land is sublet; that is to say, the freeholder lets the land, with all its risks, at a nominal ground-rent, to a speculative builder, who, by underletting himself, makes "improved ground rents." Anyone who is experienced in this sort of business knows that it is, at best, a rotten one. The builder becomes bankrupt, the mortgagee who advances to him money becomes the possessor of an ill-constructed row of houses, and the public complain, but suffer. In every instance the tenant, and not the builder, is the loser. When to this loss is added the heavy costs of lawyers and surveyors, the percentage of tradesmen, and the cost of bad labour, the leasehold house system, as our author says, becomes the most extravagant one we can conceive. We see miles of unfinished houses in every suburb of London, the results of the system being wasted material, uselessly-applied labour, and public discomfort. It is needless to describe here the kind of houses constructed upon this system. They cannot be called "homes," for, as the writer points out, the rooms are uncomfortably small in many cases, and are crammed with a class of tenants worthily called "lodger tenants," which compose the larger half of suburban London. Nor has the freeholder the control he imagines; his freehold ground-rent is but leasehold in value, while the reversion of the buildings is a mere figment, of no value whatever during his lifetime at least. There is a mistaken idea in the value of a reversion that most people fall into, and which can easily be shown if they give themselves the trouble to consult the interest tables, or make an easy calculation. To make this clear, the present value of the reversion of an estate after, say, 40 years is worth only one year's purchase, and after 60 years only a quarter year's purchase. The reviewer points out a fact patent to every dealer in property, though unknown to a large class

of lessors, that of two plots of land of equal size and value, the one sold realises at least one quarter more than the ground-rent of the corresponding leasehold lot built upon. In one case the freeholder may get (supposing each plot is worth £90 a year) £22 10s. per annum increased income, and in the other, the leasehold, only 22 weeks' rent, but which really has no commercial value, having, perhaps, 60 years to run before it becomes his property.

But the leasehold system is not only a losing game so far as property owners and tenants are concerned—it is pernicious in its effects upon the thrift of the small capitalist. Many industrious working men, who have saved a little and have become leaseholders, have been ruined either pecuniarily or morally. Often they become bankrupts; quite as often, we fear, the instruments of seamping as they are the results of the system. A great charge is brought by the reviewer, and not altogether unjustly, we think, against the working builders of London. We are told "not one quarter of the working builders about London are efficient tradesmen worth their wages. All the rest are spoiled, or have been grievously arrested in development by sub-contracting, and the present architectural and leasehold systems." The assertion has some foundation of truth; it is no less true, as admitted in another place, that speculating builders are not half so much to blame as their accusers, and are the "result of public folly." The measure of public taste is soon perceived by them as it is in every other kind of supply, and a builder, like the provision dealer or the tailor, supplies the article most in request. "As a class, certainly they are not culpably successful at the public cost, nor are they so beholden to mankind that they should sacrifice themselves to architectural philanthropy." And here we must reiterate the truth that the ordinary occupant is supremely ignorant of what affects his own or his family's health and comfort in the matter of house-building. Houses are built to look at, to appear "superior to their rental," and they reflect fairly the popular taste and requirements.

The reviewer ably shows that the leasehold house acts and reacts injuriously upon the public: it induces flimsy-mindedness and increases the unrest and mobility of the London population. Commencing with a "perfectly genteel idea, they wear their spurious gentility, a robe of Nessus, all their lives. It is the elegant and showy leasehold house that starts them on their life-long painful and unfortunate career." Tenants are a migratory class; they take a house for three or more years till, from neglect on the landlord's part, it becomes quite uninhabitable through want of repair and paint, when they leave for another house to make another move when it becomes too dirty to endure. Again, it is argued that intellectual growth and mental character are injuriously affected by this tenure; people become irresponsible, self-respect is lost, and trivial matters absorb the attention. Houses are so cramped that peace and comfort is sought for in places of public amusement, and fathers and sons betake themselves to the public-house. At least one half of the London houses are unfit for human habitation; they are either too small or too mean to live in; and all ranks of society are injured by them; west-end residents with their "compo-fronted" slips of leasehold work, as well as City clerks. "A nobleman," says the author, "till lately had a dual residence between the river and Trafalgar-square; the house has been pulled down, the site has been converted into 'frontages,' and now his Grace finds shelter in a narrow leasehold tenement that faces a cross-road behind the Queen's back garden."

In short, to the leasehold tenure is attri-

buted the chief cause of improvidence among the working-classes, the weakly, dwarfish stature of Londoners as a rule, and their enervated intellect; but we proceed to examine the remedy suggested. It is that by a weekly payment a visible investment may be secured to the working-man, in a freehold of his own. At present it is true "the inhabitants of London have no pride or satisfaction in the place; they only wish to make their fortune by its help and then to get away from it as soon as possible." "It is the first essential for efficient action," we are told, "that freeholders should be both taxed and represented, and that by some equitable system of land transfer those who are the subjects of taxation should obtain possession of the soil in fee. . . The ultimate proprietary leaseholder with more than 20 years of unexpired term should have a legislative right to purchase, at an equitable valuation, all superior interest, including the fee simple of the land; all titles should be registered and Parliamentary, and transfers should be prompt and inexpensive." Such a reform could certainly be done with little disturbance of present rights. The estates of corporations and charities may be sold with preference for the leaseholder, and the proceeds invested in the funds, by which means the land would be turned into profitable account by individual freeholders, the interest in the land would be enormously increased, and the public would be gainers by the greater care bestowed for public works. Private rights are now fenced in, to the exclusion of public enterprise and individual exertion; the expropriation of house property is called "communism" by one set of critics, as the author observes, but the same principle has been lauded by these economists when proprietors have been forced to give up land for the public good. In the interests of art, the change from leasehold to freehold would be material. No one will doubt that leasehold is the cause of all bad building; it is the invention of the present age, and our architecture has reflected the change. We have only to turn to our grand mediæval structures built on freehold land to observe the effect. In conclusion, we are tempted to quote the author's allusion to the subject of architecture. Of it, as an art, he says, "the public are entirely ignorant. There is some small scholastic and still smaller antiquarian knowledge, which gentlemen occasionally demonstrate at institutes and architectural societies. With such persons architecture is a luxury, a fine art for superior people to design and criticise; and to amuse these people, and the public who accept their dicta, millions annually are spent in travesties of art. On every other question that affects their daily lives it is supposed that Englishmen are apt to form an independent practical opinion of their own; the art of building, then, should hardly be excepted. They reproach the 'architectural profession' not discerning that their own neglect of homely art has made this counterfeit profession possible. . . . As the public grow more wise they will repudiate vain ignorance of building-work; they will at all times recognise its dignity, and, with delight, they will appreciate its value and its power." It is absurdly unreal to become a passionate admirer of antique art when everything is barbarous at home, and we can heartily appreciate the words of John Stuart Mill, that "nothing contributes more to nourish elevation of sentiment in a people than the large and free character of their habitations."

The nave of the ancient church of St. John, at Abbridge—which has some remains of workmanship of the 13th century—having undergone thorough restoration, was formally reopened on Monday. The cost of the works carried out amounts to £3,000. Mr. J. D. Sedding was the architect.

MELROSE ABBEY.*

MELROSE, like Tintern, has a host of admirers, though among this number there are many who know the ruins more by reputation than from personal examination of them. There are few, probably, of these who have not become entranced with the abbey from Scott's glowing description, who has, however, thrown around it a tradition hardly warranted by the bare record we possess. Measured drawings of historical buildings are always welcome as supplying a desirable link between written records and the building itself, and we have upon our table a new work upon Melrose Abbey Church, by Mr. Fredk. Pinches, A.R.I.B.A., consisting of measured drawings chiefly made by the author during the summer of 1878, and which obtained the silver medal of the Institute of British Architects. The work consists of ten photo-lithographic plates of large folio size, and illustrate the abbey church in a fairly complete manner. A good plan is given, well figured, with dimensions, from which we observe that the total internal length to wall of sanctuary is 245ft.; the width of nave, including aisles and chapels, 69ft. We should have preferred a little bolder style of figuring in the leading dimensions. Our readers are aware that the conventual buildings at Melrose, unlike many other examples of Cistercian abbeys, are on the north side; and this and other peculiarities have been pointed out by Mr. Walcott. Mr. Pinches says:—"The chantry chapels on the south side of the nave I am inclined to think never belonged to the original church when it was destroyed by Edward II., and afterwards restored with Robert Bruce's grant." The author thinks the restoration proceeded as follows:—"The screen was built and choir continued up to the eastern arch of the crossing, and choir inclosed from pier to pier on south side (and perhaps on north) with a wall, and this was the church which was used, the altar being placed at the crossing whilst the rest of the building, including sanctuary, chapels, transepts, &c., were being carried on." One irregularity which supports this view is that the south wall of south transept is not parallel with the rest of the church. The restoration proceeded very slowly. The south elevation is very carefully drawn in line, and no attempt at shading has been attempted—a desirable omission. It shows the beautiful Decorated tracery of the chapel windows and the rich window of transept, with its series of gable canopies and corbel steps; the bell turret in centre belongs to the Presbyterian era. The peculiarities in this part of the structure are pointed out by Mr. Pinches, such as the door in south transept and the unevenness of the masonry in parts. We must remind the reader that the original church founded by King David I. in 1136, according to the "Chronica de Mailross," was almost wholly destroyed by Edward II. in 1322, and that the present beautiful building was erected at intervals between that date and the Reformation. There is no wonder, then, that the details of many parts exhibit variations which the lapse of time had created. In 1385 the abbey was burnt by Richard II., and from this time the style of Scotch architecture became somewhat Continentalised, and the author believes that from about this period to 1512 arose all the work of the south and east fronts. There is certainly a touch of Flamboyant work in the windows of the sanctuary which is of clearly Late work, and this portion of the ruins will well repay the student for the evidence of a combination of French and English detail. The buttresses are panelled and gabled and the label terminations and curves are especially fine. Of course, the gem of

* The Abbey Church of Melrose, Scotland, illustrated. By FREDERICK PINCHES, Architect, A.R.I.B.A. London: Shaw and Sons.

the building is the sanctuary window, filled in with tracery of particularly unique character, in which there is not a single curve visible in the work, if we except the cusping, the lines being all rectilinear. The author gives a restored elevation of this window, showing also the crow-stepped parapet with its openwork of quatrefoils, of which only one at the bottom, adjoining the pinnacle, remains. The canopies of niches have a diaper-pattern carved upon their soffits. The figures on the apex, under the curved portion of label, are supposed to represent King David, the founder, and his wife, but Mr. Pinches thinks, from the time that had elapsed since the foundation, that they are more likely intended for James IV. and his wife, who were married at the church, and who greatly aided the restoration during his reign, 1488-1513. Unfortunately, a great deal of the carving, which is of great delicacy, has been subjected to rough usage.

We find that the screen, like that of other abbey churches, has been a fruitful source of controversy, some contending it to have been the great organ-screen and others a rood-screen. Mr. Pinches supports Mr. Walcott in the latter supposition, and, from the evidence of position and date, we think it must have been a rood screen. We detect here a small clerical error in describing it to cross the church in a line with east wall of No. 7 chapel. The plan shows it to be that of No. 5. All visitors to Melrose must deplore the clumsy square piers upon the north side upon entering the choir, which were built against the original pillars, and which carry a vault of clumsy oviform shape of rough masonry—this work was done in 1618 for Presbyterian worship. The only part of the groining to choir that remains are the springers. The tower arches and piers of the crossing are fine, and the carved caps to pier on the south side and those of nave, given in plate 8, extremely interesting as examples of conventionalised foliage; in this case it is suggested by the Scotch or Curly Kail. The detail of bay in north transept, of which an elevation and plan are given to a good scale, is extremely interesting; and Mr. Pinches' monograph is rendered additionally interesting by the sketches of details given in plate 6, the chief fault we have to find being that the shading in some instances quite spoils the work, as in the label terminations.

We are rather sorry better interior views do not accompany the details. The view of north transept would not have suffered, from an architectural point of view, if the shading had been omitted, and we should prefer plain outlines to the carved details on plate 4. Mr. Pinches has wisely, on this account, contented himself with giving the architectural features mainly, and has avoided the illustration of the carved work. The vaulting to the aisles is not illustrated we find, and is the exception to the above remark. Few remains are so rich in the adaptation of natural foliage as those of Melrose. Flowers and plants of the simplest kind have been studied by the carver, amongst these being imitations of rose-leaves, thistles, ferns, oak and ash. The volume is prefaced by a rather bare historical sketch, the style of which scarcely does the draughtsmanship justice, though the author has consulted some of the leading authorities, chiefly the "Chronicle of Mailross," which gives an account of the abbacy from 735 to 1270, from which we learn that the abbey was finished in 1136 and dedicated in 1146. Of the original pile little is said and nothing that is certain, though Aidan is supposed to have founded it about the middle of the 7th century, and this structure, now called "Old Melrose" stood about two miles below the modern abbey. Mr. Pinches' volume is handsomely

got up, and dedicated to the Duke of Buccleuch, and is certainly the most carefully prepared monograph of the abbey we have yet seen.

SAINT ETHELREDA'S CHAPEL, ELY-PLACE.

FEW people are aware that close to Holborn may be seen a small, but as pure and as beautiful a specimen of Mediaeval architecture as either Lincoln or York Cathedral itself. The church of St. Ethelreda, in Ely-place, was on Monday last reopened, after a thorough restoration, undertaken by the Fathers of Charity. The chapel in Ely-place was, as many of our readers are aware, a portion of the London palace of the Bishops of Ely, and was dedicated to Ethelreda, a daughter of the King of the East Angles, who was canonised for her virtues, and who founded the great religious house at Ely. The episcopal buildings, with the exception of the chapel, were demolished at the latter end of the 18th century, and in their place the present houses, in the sombre brick style of that period, were erected, forming Ely-place. The chapel itself was saved, but suffered from the characteristic apathy and indifference of the age. It was long known as Ely Chapel, and was used as a place of worship for a Welsh congregation. At that time the grand east and west windows were blocked up, and the beautiful tracery all but destroyed. The little fabric was choked with dirt and whitewash. Early in 1874 the building was sold under an order of the Court of Chancery, and was purchased by the Rev. Father Lockhart for the Fathers of Charity, who, with most praiseworthy energy commenced the present restorations. The chapel is a small parallelogram, about 80ft. long by 30ft. wide, and 50ft. from floor to apex of roof, below being a crypt of the same dimensions. The walls are divided into seven bays by a beautiful and delicate arcading, five of the wide bays having windows of Decorated tracery, which have recently been restored from the single example that remained at the eastern end. Not long ago, indeed, the window openings were filled with sash-frames, and a portion of the tracery was found in the brick wall of an adjoining house. We now see this unique chapel as it appeared probably in its primitive condition. The whole of the unique wall gablets between the windows have been restored where defective, and together with the window tracery produce an effective arcading on each side. The gablets are acutely pointed, and rise to the height of the adjoining window arches, whose inside drop mouldings form the continuation. Their heads are filled with light tracery, consisting of trefoiled cusping, and are enriched by crockets and finials. The carved stone corbels in the spaces are to have statuettes, as originally intended. The windows are two-light, and each consists of cusped heads and trefoil, with a cusped sexfoil in the apex. The jamb and mullion shafts have delicately carved foliage capitals, and the manner in which the stonework has been executed is everything the most conservative restorer could desire, the sections of the mouldings and tracery having been carefully taken from the remaining fragments. These side windows have been filled with plain toned glass, with the exception of the south-east one, in which stained glass of a Geometrical character, yellow in tone, has been inserted. Two bays at the west-end have merely the blank cusped tracery to relieve the wall surfaces. Turning to the two fine windows at the east and west ends, we find the same care has been exercised in their restoration. Architecturally, they are too well known to need description here, and we have already illustrated them, together with other details of the church, in the BUILDING NEWS of June 1st, 1877, page 538, Vol. XXXII. The great eastern window has been filled with stained glass at the expense of the Duke of Norfolk, at a cost of £2,000. Figure subjects occupy the five main lights, while the three larger circles in the head have been also filled with figures. The colouring is bright, of considerable depth of tone, and we believe the design has already given rise to criticism. We must confess, a little less crudeness in the colour would have assisted to give value to a window of Geometrical design, unsurpassed, if it is equalled, in this country. As it is, however, the artist, Mr. Saunders, of Endell-

street, has exhibited a considerable amount of skill in not making the figures obtrusive, and in following good precedents in the style; and his window at the side must be pronounced exceedingly rich and harmonious. The new altar is of stone, and has been designed with much discrimination from old models. It consists of a plain bevelled slab of stone resting upon side piers of octagonal form, having angle shafts, which stand upon a plain moulded base. The caps are characteristic of the style, simply moulded. Upon the altar stands a richly-designed alabaster throne and tabernacle, canopied for cross, and adorned with pinnacles and gables, and the whole has been executed with considerable feeling and skill. The roof of oak has been exposed to the framed rafters, and is of plain barrel-polygonal shape, with moulded tie beams, king-posts, and braces. Its brown massive timbers form an agreeable contrast to the Caen stone ashlar walls. The seats are open, with square bench ends, and a new organ is placed on the north side of the chancel. One of the most interesting relics of the older chapel is the Saxon font. It is of Purbeck marble, and consists of a plain circular bowl with four rib-like projections on the out-side, and now stands on a circular stone base. There are few examples of Early English doorways which surpass the main south entrance to this chapel. The three-jamb shafts have been carefully restored and the mouldings now look as sharp as when first cut. An illustration of it appeared in the BUILDING NEWS of the date we have mentioned. The sedilia still remain. The stone used for the shafts and tracery is Stoke Ground from Chippenham, a very hard limestone. The material of the old walls was Kentish rag. On the outside we observe that the octagonal turrets which flanked the eastern front have not been restored, though the bases exist. The irregularity of the masonry at once discovers to the critical eye this omission, and we hope when the funds permit they will be carried up and be crowned with the conical cappings which once so agreeably finished the gable ends. The crypt below has also been restored.

The solemn re-dedication of the chapel was performed last Monday by Cardinal Manning. The work has been carried out under the careful superintendence of Messrs. John Young and Bernard Whelan, architects, by Mr. M. F. Doherty, contractor, of Blackfriars-road. It has, we think, been done thoroughly, and with a conscientious regard to the old structure.

MODERN ART FAIENCE.

THOSE who are interested in faience and decorative art will find the museum of Messrs. Trollope and Co., of Halkin-street, Belgrave-square, well worth a visit. Under the able art directorship of Mr. G. T. Robinson important acquisitions have been made, chief among which must be mentioned some choice decorative earthenware of foreign manufacture, in which the two hitherto irreconcilable elements of artistic design and moderate price are combined. It has been the main object of this enterprising firm to show that common clay wares may be treated both decoratively and inexpensively, and with this purpose in view they are now exhibiting some exceedingly artistic products in the commoner kinds of material. We especially draw attention to the Swiss and Hungarian pottery, not only for the beauty of the designs, but for the colours and glazing. Many collectors of art pottery would be surprised to find that the modern art labour of Continental countries can still produce works of artistic design and excellence, and they would be obliged to admit that only a mere passion for antiquity would induce them to purchase old ware. The Swiss pottery is particularly rich in colour. Generally a dark brown or black ground is given to the body, upon which flowers and foliage of bright colours are painted highly glazed. The body of the vase or piece is well covered, and the design has a very rich effect. Some beautiful specimens of this ware are to be seen in Messrs. Trollope's Museum, comprising vases, bowls, and other ornamental kinds of pottery. The French glazed ware forms a unique selection. We noticed some charming vases of deep blue, green, and other blended colours, the work of a comparatively obscure artist whom the artistic discernment of Mr. Robinson will doubtless bring into repute. For delicacy of manufacture and

refinement of design the Hungarian and Austrian examples are unsurpassed. These have a white body of pipe-clay, upon which the designs—Persian in character—are painted in blue, and gold, red, maroon, and other bright colours conventionally treated, though with considerable freedom. We noticed a collection of beautiful and delicately covered vases, dishes, and plates of this ware; some exceedingly simple and inexpensive plates, painted with figures in outline. One dish we noticed with a very effectively simple design in outline was only 5s. 3d.; another set of four pieces was 15s. 6d.; two charming plates, with figure subjects drawn in blue outline, 5s. each. A pair of handsome blue and white fruit dishes, with a very rich embossed design and borders, were equally cheap. The geometrical and floral patterns upon some of the more elaborate objects are extremely delicate and truthful. The borders are in some instances plain bands of blue, in others of Oriental intricacy, and the case of blue aster ware is deserving notice. A pair of large dishes of Hungarian manufacture, in a rich brown body colour, have an engraved border of very telling effect; the engraved portions remove the dark colour and produce a tortoise-shell appearance to the parts scooped out. We notice also of Austrian design a very well designed flower-stand or fountain of terra-cotta, coated with a rich glaze of a deep bluish-green hue, and admirably adapted to adorn a conservatory or a hall. Modern Italian faience is illustrated by some beautifully hand-painted vases and other objects, with figure and allegorical subjects upon white grounds. We observed several beautifully designed vases, copies from the antique, exceedingly spirited in design and rich in colour, the work of Castellani. Blue and yellow are the predominant colours, and the painted dishes and plaques are admirably suggestive of ancient work. We must not omit to say that the once-forgotten metallic lustre ware may be seen in some beautiful Florentine pieces; a few plates with blue designs on a gold or bronze ground being very striking. One pair have emblematic figures in the middle with musical instruments, another with the head of Petrarca. The specimens brought together by Mr. Robinson are marked by considerable excellence as works of art, though they all exemplify what can be done by simple methods of decoration upon the common earthenware. The sgraffito treated glazed earthenware is very suggestive in this way, so are the lava painted panels. But we wish to draw the attention of our architectural readers to a few more special exhibits. Of a utilitarian kind we must mention some terra-cotta glazed tiles for back buildings and decorative roofing purposes. These consist of plain ornamental tiles of lozenge and other shapes, with an indestructible glaze upon the surface, which may be produced in grey, red, and various colours. For reflecting light in areas and courts we believe there is a large field open for the use of these washable and impervious tiles. We must mention also some well-designed and modelled terra-cotta pilasters in slabs for decorative brickwork. Those we noticed were 9ft. in height, and of proportionate width, and were £6 10s. the pair. The design was Renaissance. Of sanitary appliances, we must call attention to some excellent nickel-lined copper baths. The one we saw had an improved arrangement of taps and mixing cylinder. The advantage of the material is that it is self-cleansing and indestructible, and the bath has no unnecessary casings. A shower and spray bath, with taps and pipes of nickel, is the best of the kind we have ever seen. Every part of the body can be subjected to the shower jet or spray, and the hot and cold water can be regulated, mixed, and directed with the greatest nicety and ease by the patient himself. The latter is priced at £66.

We may draw the attention of architects to a highly decorative kind of relief panelling in gesso, the revival of an old process, which Mr. Robinson has introduced. A door of mahogany treated in this manner with its panels decorated in gesso and gilded, having ebony and gilt mouldings, and the effect was striking and rich. Another mode of decorative finish deserving the notice of the profession consists in a kind of Japanese laquer panels, and a beautifully-executed series of panels treated in this manner for the Cunard Line steamer *Gallia* is now on view. The Mexican onyx is a very beautiful feature to be noticed in this museum. We particularly call attention to the semi-transparent chimney-pieces

partly and entirely made of the onyx; also a balustrade, the cost of which we believe per foot when highly polished is £15. The Mexican onyx is a remarkably hard material, and its sea-green transparent and opaline tints are of the most charmingly varied kind. As a valuable decorative application upon this material we notice a panel of onyx with a relief ornament in gesso, and we think as an interior mode of wall and panel enrichment the process is likely to become one of much beauty and utility.

A WHOLESALE JAPANESE WAREHOUSE.

THE name of Dr. Dresser has long been very well known in connection with ornamental design, and he is the author of several popular books on the subject, some of which are of a costly character. During the last few years Dr. Dresser has travelled in Japan and the East, making himself practically acquainted with the manufactures for which the Orientals are famous, and one result of these trips is the large and varied collection of goods with which Dr. Dresser, in conjunction with Mr. Holme, has stocked the large warehouse which was last Saturday opened to private view in Farringdon-street. The building thus occupied is the singular and striking house erected by Mr. Hyatt, the patentee of the prismatic area lights, and here the several applications of his patent are shown throughout the building. Messrs. Jackson and Graham, under the direction of Dr. Dresser, have decorated the interior of the building. The want of a good staircase above the first floor is a very considerable defect in the arrangements. The stock above referred to consists chiefly of purely modern Japanese and Indian productions, such as the common Owari blue ware, in vases, flower-pots, and plates, which particularly lends itself to decorative purposes as well as domestic use. The Kishin lacquer trays and cabinets and Japanese basket work also are available for these uses. The Awata and Tokio ware are both imitations of Satsuma ware, which is itself called by the Japanese Tsuchi-yaki, or clay ware, to distinguish it from porcelain; and these deserve notice as quiet and yet richly coloured faience of creamy tone, not of course equal to Satsuma, but sufficiently interesting for ordinary purposes, and within the means of moderate purses. Some of the Tokio ware, however, is much more rich in colour and gold, and is made in large and expensive pieces though always refined. The silver and ivory work of the Japanese are of course among their more famous productions, and these are largely represented at Farringdon-street. The same may be said of translucent enamels and cloisonné on metal, of which there are many beautiful examples. The Bombay ware, though coarse in detail, is very soft in general effect, and devoid of the harsh colouring of the yellow and gay green characteristic of the Scinde manufacturers. The Kioto ware teapots are curious as well as varied in form, and the collection includes several specimens of old Persian brasswork, and also a quantity of Moradabad metal ware, with the silver-like chased tin products from Lucknow. On the third floor Dr. Dresser's curios are located, but only a small selection of these were shown on Saturday, including some antique turquoise Celadon vases, and another said to be a thousand years old. The top story of the building is used for a carpet showroom and store. In conclusion we have yet to note the entirely new Linthorpe pottery, which has undoubtedly much both in colour and design to secure its very general use as an inexpensive class of decorative pottery. It has been introduced by Dr. Dresser, from whose designs the articles are made, and most of the specimens are very successful, though there certainly is a tendency towards extravagance which it would be better to avoid. The brilliancy of the glaze is excellent, and almost any colour is obtained, the cheaper kinds being simply produced by dipping, though as simply a clay ware none can be well of a costly character.

THE ANNUAL REPORT OF THE METROPOLITAN BOARD OF WORKS.

THE volume annually issued by this Board recording the work it has carried out during the previous twelve months becomes each time a thicker volume, testifying to the increasing work laid upon this anomalously-constituted but ener-

getic Upper House of the metropolitan local authorities. That for 1878 is now before us, and deals with a wide variety of subjects. Under the heading of "Sewage and Drainage" reference is made to the way in which it is being attempted to obviate the floodings to which various low-lying parts of the metropolis are subjected on occasions of heavy rainfalls. These are in addition to the intercepting sewers, which were not designed to take the waters which fall during excessive rainfalls, such, for instance, as that of the 10th and 11th April, 1878, when an average of 2.64 inches of rain, or nearly one-seventh of the average yearly rainfall, was discharged over the whole of the metropolitan area within 19 hours. To intercept such a volume of water as this would, it is remarked, have necessitated intercepting channels of the capacity of rivers, and these would have been nearly empty except on occasions of extraordinary rainfall. During the latter part of the year just ended works have been in progress having the twofold purpose of relieving Battersea and the adjacent low-lying parts from flooding, and of providing an efficient outlet for the drainage of the district which lies to the east of the line of the southern high-level sewer. The contract for the new sewers was originally undertaken for the sum of £16,800, but, in consequence of failure on the part of the contractor, the contract was relet by the Board on the 9th August last to Messrs. Williams, Son, and Wallington, for the sum of £17,800. About 1,920ft. of the main sewer has been completed, and a further length of about 1,000ft. is in various stages of progress. Works of similar character will shortly be commenced in Kilburn, the total length of the two new sewers being about 1,230ft., and the diversion and covering in of the Stamford Brook, Hammersmith, was completed by Messrs. Nowell and Robson in July at a total cost of £4,685. During the year plans for about 44 miles of sewers, varying in size from 4ft. by 2ft. 9in. in brickwork, to a 9in. pipe, proposed to be constructed by vestries and district boards, were submitted to the Board; and, in addition to this, 458 branch sewers were connected with the main sewers under the superintendence of the board's officers. Reference is made in the engineer's report to the electric lighting experiments still being conducted by the Société Générale d'Electricité on the Victoria Embankment, and to the erection on the same Embankment, at Adelphi Stairs, of Cleopatra's Needle. During the year the important new line of thoroughfare from Old-street to Oxford-street was constructed and opened to the public, and there were commenced the new thoroughfare from Shoreditch High-street to Bethnal Green-road, opened for use early in the present year, and the Sun-street to Worship-street improvement (forming what the Board last Friday decided to name Appold-street), let to Messrs. Nowell and Robson, and now in progress. None of the extensive street improvements proposed under the Act of 1877 have yet been commenced; but the report mentions that the widenings at the Angel, Islington; Mare-street, Hackney; the Deptford Creek Bridge approaches; Camberwell-road, and Church and High-streets and Queen's-road, Peckham, have been selected to be first proceeded with; and that those at Tooley-street, Borough, and Jamaica-level, Bermondsey, will follow; and adds that for these several improvements a large amount of house and other property has already been acquired and cleared away preliminary to forming the widened thoroughfares on the sites thereof. Under the Artisans' Dwellings Improvement Act, 1875, one, the Whitechapel and Limehouse scheme, was at the close of the year so forward that tenders were invited for the paving works of the new streets; the Bedfordbury and Whitecross-street schemes were in a forward condition, and six others were in various states of preparedness. Two new schemes received the sanction of Parliament during the session of 1878, and three further schemes, dealing with areas in Wells-street, Poplar, Little Coram-street, SS. Giles and Paneras, and Great Peter-street, Westminster, were prepared and are now under consideration in Parliament. Other paragraphs of the engineers' report deal with the unsuccessful Metropolitan Water Supply Bills, the condition and overflows of the Thames, and the proposed high-level Tower-bridge, as to which two last-named projects Bills are now being considered in committee by the House of Commons. During the year sixteen applications

from vestries and district boards for loans of or permission to borrow elsewhere sums of money for purposes of improvement; of these loans sanctioned, £67,587 was for works of paving, £11,905 for sewerage, £2,987 for road and street improvements, and £1,800 for river wall, bargebeds, and repaving at Chelsea parish wharf. During the year the following railway bridges over and under public roads were constructed or altered under the superintendence of the board's officers:—Bridges over roads—Old Ford-road, Bow, by the Great Eastern Railway; and by the South-Western Railway, York-street, Granby-place, and near Aubyn-street, all in Lambeth; under a road, New-cross, by the Brighton and South Coast Railway.

The superintending architect's report to the Board commences with a summary of the Metropolitan Management and Building Acts Amendment Act, 1878, of which the first part relates to the width of roads or ways, whether highways or not, and regulates the position of buildings adjacent thereto; it also gives the Board a limited jurisdiction over existing theatres and music-halls, containing a superficial area of not less than 500 square feet, and enables the Board to make regulations as to the position and structural arrangements of theatres and music-halls hereafter to be licensed. By part 2 of the Act power is given to the Board, with the consent of one of Her Majesty's principal Secretaries of State, to make bye-laws for regulating not only the materials to be used in buildings, but also the preparation of sites and foundations. The provision contained in the Metropolitan Building Act, 1856, with reference to the recovery of dangerous structure fees, is also thereby amended. Under the head of District Surveyors, reference is made to two changes made in the year in the limits of districts. The metropolis is now divided into sixty-four districts, and during 1877 there were 24,288 building operations, for which a gross total of £40,349 8s. 6d. was received in fees. Fees amounting to £1,521 14s. 5d. were remitted or lost during the year 1877, and the office expenses of the district surveyors were returned as amounting to £8,748 6s. 5d. There is a considerable difference in the amount derived by way of income from the several districts. The gross fees received in thirty-four districts varied from £82 to £599. In one of these districts the receipts did not amount to £200; in nine the receipts were less than £300; in five less than £400; in eight less than £500; and in eleven less than £600 each. In twenty-eight other districts the receipts ranged from £620 to £2,704. It is mentioned that the whole of the river plots on the Chelsea Embankment have now been let. During the past year £52,559 was voted by the board towards the cost of local improvements contemplated by the district boards and vestries, and estimated to cost £106,898 11s.; and £38,804 14s. 6d. was paid on the completion of improvements being certified. The parks, commons, and open spaces now under the control of the board cover an area of 14,573, and cost in maintenance during the year, a net sum of £13,905, the chief item being Finsbury-park, £6,260, where a great deal of tar-paving, re-gravelling, and other works has been carried out; Southwark-park, which absorbed £1,980, and Victoria and Albert Embankments, £1,455. Under the head of Fire Brigade Stations it is mentioned that the new headquarter station of the brigade in Southwark-bridge-road had been completed; a new station erected on Shooter's-hill by Messrs. Hook and Oldrey at a cost of £4,945; premises in Chapel-place, Knightsbridge, altered by Mr. C. W. Reading, for £1,192, and a new station is contemplated at Greenwich, in Grove-street, in place of that in Blisset-street. During the year, 2,146 dangerous buildings were brought to the notice of the Board, of which 1,527 were dealt with by the Board, or after the cases had been heard by a magistrate; 140 were reported not dangerous; in 430, actions were still pending at the close of the year, and in all the other 49 cases the works were promptly executed by the owners. The report adds that at no period since the Board has had jurisdiction in respect of dangerous structures within the metropolis, has so large a number of cases occurred, or been so successfully dealt with as during the year 1878; out of the total of 2,006 dangerous structures proceedings had to be taken before a police magistrate in 398 cases; and in every case, without exception, these proceedings were successfully maintained.

THE RAMSGATE MARINE DRIVE.*

WE have received a small brochure written by Mr. Percy W. Britton, C.E., upon the Ramsgate Marine Drive, which deals generally with the question. Mr. Britton is a competitor, being the author of a design bearing the motto "Perseverance per se Vince." How far he is entitled to speak readers must decide for themselves, but he does so with the authority of one who has carefully studied the problem. As he observes, an award has been made and seemingly set aside by almost universal consent. Mr. Britton analyses at some length the requirements of the schemes that have been proposed, and observes of the first, to which the premium is awarded, that "it is far too costly to be taken into consideration," while the "second scheme provides for a continuous view of the chimney-pots of the town, and is calculated to ruffle the temper of those who want to get from either cliff by a decent road," while "all the premiated designs sedulously avoid being nearer to the front than is rendered absolutely necessary by the limits of deviation." Those who have examined the designs will substantially agree with these allegations, and we were astonished to find that the "front road" was avoided by the favoured proposals, notwithstanding that it offered a better promenade and other advantages we have already pointed out. Mr. Britton's plan certainly meets the requirements in a more desirable manner, if it does not give us the most pleasing line of curve. The road is kept to the front, but not too close to the harbour. The line it takes follows the direction of the Military-road, passes over the Crown Hotel site, and crosses Harbour-street on the level; it then makes a rather sudden turn at Albion-hill, which it diverts, cuts diagonally across Albion-place, and thence follows the boundary of Wellington-crescent on the eastern cliff. On the western side the road would overhang the brow of the cliff, being carried on brick arches and piers of 30ft. span built into the face of cliff from Nelson-crescent to York-street. The roadway is thus partly carried by a half-viaduct, and partly follows the existing levels in the centre of the town—a plan that at least has the merit of being economical in construction. Mr. Britton, referring to the instructions, observes that the condition that the road must allow of easy and direct access from either cliff to the main street and central portion of the town, has not been complied with by those schemes which provide merely a roadway from cliff to cliff, without regard to intermediate points. This is very true, and it is one point that of course ought to determine or assist in determining a plan. In one or two of the plans we have pointed out this requirement has been met by branch roads. Again, it is contended by the author that the viaduct scheme is not suitable for a promenade, we certainly think it partakes too much of the stilted and artificial to become a pleasant one. There is even a more important argument in favour of the front route to which we have before drawn attention: it is the necessity that will be created by it for sweeping away the existing dingy and flimsy old houses and cottages in the centre of the town. No one who has visited Ramsgate can regret to see removed the dilapidated and tenement-like class of property which occupies the hollow facing the harbour. At present this part of the sea frontage is a disgrace to the town. Access to the centre of town with means of easily reaching the sands are points that have to be kept in view, and it appears to us that the designs selected have not sufficiently taken them into consideration. Mr. Britton's proposition at least keeps in view the requirements and limitations of the Ramsgate Commissioners; it provides access to the town, and leaves access to the sands; it communicates easily with existing roads, and it preserves, what is quite as important, a natural and easy route between the opposite cliffs. We do not think a lofty viaduct scheme the best; it would always possess an artificial appearance, and would require to be treated with some architectural skill, to blend easily with the scenery. Those who are interested in the improvement would do well at least to read Mr. Percy Britton's sensible remarks, bearing in mind, however, the manner in which other designs have met the question. We can-

not agree that the designs, "Audacter et Sincere," "Front," and "Westminster," are so particularly destructive to property as the author required, seeing that the reconstruction required would be practically limited to the front and least valuable portion of the town.

LAMBETH PALACE.

ON Saturday afternoon, a large number of members of the newly-established St. Paul's Ecclesiastical Society, paid a visit to Lambeth Palace Chapel and Library, under the guidance of Mr. J. P. Seddon. The members assembled in the first courtyard, where Mr. Seddon gave an historical sketch of the palace. The original building, he said, was erected by Archbishop Baldwin, who obtained the site by exchange with other land in the Isle of Grain, with the then Bishop of Rochester, in 1180. His object was, that his proposed new church and dwelling should be at a distance from, and beyond the influence of the monks of Canterbury, who had prevented him from establishing a cell of secular canons in their vicinity. Baldwin then commenced a chapel at Lambeth, with the intention of making it collegiate, but his death in the Holy Land in 1190 prevented his completing his purpose. The monks of Canterbury, zealous lest the metropolitan see itself should be transferred to London, continued their opposition to the design, and prevailed on Pope Innocent III. to issue a bull commanding its abandonment. In 1202 it was agreed, however, that a church and establishment of not more than twenty Premonstratensian canons might be built elsewhere in Lambeth than on this site. Archbishop Hubert relinquished this project, but made Lambeth his metropolitan palace, and his successor, Langton, improved it. Archbishop Boniface, however, in 1216 was ordered by Pope Urban IV. to build and repair the house at Lambeth, and the chapel, which is the earliest portion of the extant buildings, is probably his work, though it is difficult exactly to distinguish the buildings of that prelate and his successors. The palace at that time consisted of a manor house of a form then customary, the plan being one with buildings surrounding three sides of a rectangular court open to and facing the river, inclosing a cloister. The present chapel formed the left projecting wing of this structure, having its western front and entrance doorway then exposed. What is termed now the guard-room, parallel to the river in the rear of the chapel, occupies the position of the central block, while the buildings which formed the right wing have been destroyed to make room for the library, &c., which extend far beyond the original site. The "Lollards' Tower" was built afterwards outside to the west of the chapel and abutting against it; it was erected in the archiepiscopate of Chichele, 1424-45. The present entrance-gateway of brickwork, through which the visitors had just come, was built by Archbishop Morton, about 1490, and Archbishop Juxon, who would ever be remembered in connection with the execution of Charles I., constructed the Great Hall, which for some years past has been converted into a library.

Passing into what was once the cloister, now surrounded by modern red brick buildings and offices, Mr. Seddon called attention to the ancient masonry of the south side of the chapel just visible over one of the palace buildings; the wall has, he said, been capped by Blore with a wretched battlemented parapet, behind which rises his high-pitched roof. Outside the chapel, in the apartment beneath the Lollards' Tower, Mr. Seddon resumed his description. This room was known, he remarked, as the Post Room, from the great octagonal oak beam in the centre supporting the framing above. Till Chichele added this tower, the beautiful west doorway facing the members was external, and could be seen from the river. As they saw, it had a semi-circular head, but all the details were of a pure and delicate Early English type; the combination of these with the rounded form was rather curious, but instances of such transitional use of old-fashioned features as the circular head in a new style were not unknown, and in this case it seemed to have been adopted to provide sufficient space for the beautiful five-light window above, new, of course, blocked up by the first and second stages of the tower. This arch was elaborately and well moulded in three orders, the third one subdividing it into two equal trefoil-headed

openings. The head and spandrels above these openings were pierced. The outer arch was supported on Purbeck marble jamb shafts, and in the centre of the doorway was a group of three columns of like material, forming the sub-division of the entrance. The outer arch has settled, and the voussoirs are a little out of place. Entering the chapel, it was pointed out that it consists of a simple parallelogram on plan of stately proportions, being about 72ft. by 26ft. clear internal dimensions, with walls 4ft. thick. Both sides of the chapel are divided by bold buttresses without, and corbels for vaulting within, into four bays, each filled by a noble three-light group of lancet windows, of a type which would remind members of what they recently saw in the Temple Church. At the east end is a series of five lancets corresponding with that now blocked up at the west end. All the windows have detached internal bearing shafts of Purbeck marble, with moulded caps and bases, and beautifully moulded arches above. He might mention that externally the side windows are comprised beneath single deeply-recessed arches springing from the buttresses. High up on what was the central light of the western window, Archbishop Juxon inserted a small oriel upon a semi-octagonal corbel, with an angel carved thereon, bearing a shield, on which are the Archbishop's arms; it communicates with the chief floor of the Lollards' Tower, which was probably occupied during service by some members of the Archbishop's household. Archbishop Laud refitted and adorned the chapel during his primacy, and erected the screen which now divides the building into chapel and ante-chapel; this is of oak, and is carved elaborately, but in poor and heavy fashion. All the quadripartite vaulting was the work of Mr. Blore, and he was sorry to say, is only executed in lath and plaster. When Mr. Burges was employed by Blore on the work there was enough of the old lines to admit of their being followed, although the mouldings are not equal to the original ones. Concealed by this vault is a tremendous roof, clumsily executed in queen-post fashion with great waste of timber.

At the trial of Archbishop Laud, it was alleged against him that he had "repaired the story of the windows by their like in the mass-book." The subjects with which they had been previously illustrated in painted glass were from the history of the world, from the Creation to the Judgment, but these had since been replaced by lights of plain stamped glass, and were partly blocked up. Recently this chapel has been repaired by Archbishop Tait, assisted by a committee.* It has been partially decorated with new stained-glass windows, and painting on the walls and vaulted ceiling of the eastern-most bay by Messrs. Clayton and Bell. This bay adjoins the domestic part of the palace used as a vestry, and an organ is being placed in the north opening in a portion of the palace used as a vestry. The east window was in a dangerous condition, and was cracked at the angles. It has been rendered secure and coated externally where needed with Portland cement concrete; if the unsightliness of this work can be excused at all it is because it is now only visible in a small courtyard of domestic offices. During these works a curious doorway and passage were found in the south side of the gable over this window, leading to the space above the vaulting. Beneath the chapel a very fine crypt exists, but it is partially blocked up with earth, and is now used as a wine-cellar. It is divided into two aisles of four bays by circular pillars, and has plain groining, supported at the angles by moulded corbels. The details, though less elaborate, much resemble those of the chapel above, and like it, the crypt appears to be all of Boniface's time. Although much has been done to rescue this chapel from the sad and degraded condition into which it had fallen, through the neglect of centuries, and the injudicious work done to it at the beginning of this century, much, said Mr. Seddon, remains to be accomplished. Some of the windows are yet partly blocked up, the vaulted ceiling, painted though a portion of it is, is but lath and plaster, beneath a mean modern roof, which is a source of danger from fire, and a disgrace to the age which erected it and permits it to remain; the crypt is half-buried and is used for storage purposes, the external walls and buttresses are

* The Ramsgate Marine Drive. By PERCY W. BRITTON, C.E. Leeds: Bernard and Co.

* A critical description of this work, for which Mr. J. P. Seddon was the architect, appeared in the BUILDING NEWS for May 10, 1878, p. 465, Vol. XXXIV.

terribly defaced and decayed, and the brick parapet walls are an eyesore from all prominent points of view of the palace and its surroundings. The construction of suitable stone vaulting to the chapel, with an appropriate high-pitched roof with the eastern gable surmounted by good stone copings and cross, are improvements so necessary and so urgently called for, that it is to be hoped that they will not be left for another generation to accomplish.

The members then visited the prison in which the Lollards were confined previous to their execution by burning. It is a small apartment in the top story of the tower, barely 12ft. square and 8ft. high. It is entered from the turret staircase by a double door, both well studded with nails and other ironwork, and lighted by two small deeply splayed lancets. The walls and ceiling are covered with stout oaken wainscoting, fully 1½ in. thick, and at intervals about 3ft. above the floor project a series of eight staples, on which are stout wrought-iron rings, 3½ in. internal diameter, to which the prisoners were secured. The walls and ceiling are scored with initials, names, and broken sentences, chiefly in dog-Latin, cut by the followers of Wyckliffe. At the top of the stone turret is a small, picturesque, hooded bell-cote of the 15th century, from which, and the tower-leads beneath, the visitors obtained a fine view of the river, the Houses of Parliament, the extensive palace gardens—actually larger than Lincoln's Inn-gardens, and yet scarcely known to exist by those who pass along the busy streets by which they are inclosed—and of the south-west portion of the metropolis. The members transversed a long gallery, and reassembled in the guard-room, now used as the state dining-room. It is a noble apartment. The roof is divided into four bays by large timber arches spanning the structure, and decorative arches of wood also support the wall plate, and arched braces the purlins above. The spandrels of the principals are filled with richly-moulded tracery. A modern panelled flat ceiling hides the upper part of the roof, which originally was open. Like the gallery, the guard-room is hung with a series of highly-interesting portraits of former occupants of the archiepiscopal see. Mr. Seddon mentioned that excellent drawings of the chapel and its details, and of the roof of the guard-room, are given in the valuable work by Mr. F. T. Dollman, one of the vice-presidents of the Ecclesiological Society, entitled "Examples of Ancient Domestic Architecture, Second Series."

The visit closed in the old hall, now well known as the Library, built by Chicheley, and chiefly reconstructed by Juxon, on the Mediaeval lines, but with 17th century details. The hammer-beam roof, in four bays, is an excellent example for its time, and closely corresponds with that over the guard-room; it is of oak, richly carved, and the trefoiled openings and heavy pendants exhibit curious examples of an attempt to imitate the late Gothic mode of ornamentation. One of the best features is the picturesque central lantern. Mr. S. W. Kershaw, M.A., gave an historical account of the library, which he said was founded by Bishop Bancroft, and was added to by Archbishop Juxon and others. During the Civil Wars, when the whole palace was pillaged, and turned into a prison and stable, the collection of books was removed for safety to Cambridge, from whence it was re-demanded by Sheldon, and housed, till within the last 40 or 50 years, in the cloister of the palace. It includes many early illuminated missals and other MS., a number of specimens of Caxton's printing, one of the so-called Mazarine Bibles printed by Guttenburg, a vast collection of historical pamphlets, especially of the time of Henry VIII., and many works on theological and civil law. He should be happy to afford any further information on any Monday, Wednesday, and Friday, on which days it is open free to the public from 10 a.m. till 3 p.m. throughout the year. Before leaving the palace the members expressed their thanks to Mr. Seddon, and also to Mr. Kershaw, for the information so pleasantly imparted.

LIVERPOOL ENGINEERING SOCIETY.

At the fortnightly meeting on the 18th inst., a paper was read by Mr. E. Cornish, on "The Management of Tide Work," in which the author described the plant necessary for,

and stated the precautions to be taken when constructing heavy masonry works in a tideway.

He commenced by stating that an important point was to ascertain the direction from which the heaviest seas came, so that the end of the work in progress may be as much sheltered as possible. Having determined upon the point to commence operations, the position of the well for draining the foundation trench should be carefully considered, so that the lines of rails for supplying materials may be brought in conveniently and laid with easy curves. The position having been fixed, the staving should be erected over it, so that the Goliaths or travelling crane may be used for sinking the well and fixing the pump. The well should be such a considerable distance below the level of the foundations of the work, to form a reservoir for the double purpose of scouring out the "lander," and quickly running off the water from the workings. The necessity of providing a blow lander was pointed out for letting the water into the workings to the level of that outside, to prevent the rising tide rushing in upon the "green" work, &c. The author recommended the chain pump for this class of work, having had one working for eighteen months without requiring any repairs, and that it should be driven by a belt in preference to gearing. He next considered the staving, stating that the cost of timber in piles driven was three to four times that of timber erected as runners, &c. In place of the piles being spaced at about 13ft. centres, he advised the adoption of 20ft. centres with double runners, as requiring less labour, and being more economical. The author concluded with some remarks on the necessity for keeping the Goliaths on the rails, the ballasting of cranes, the shape of contractors' waggons, the most economical way of supplying materials to the works, &c., and after a discussion the usual vote of thanks was accorded.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE closing meeting of the present session of the Institute was held on Monday, the President, Mr. John Whitehead, in the chair. Several donations to the premises improvement fund and to the library were announced by the Secretary; and the President, in proposing a vote of thanks to the donors, referred especially to a monograph on Melrose Abbey, presented by the author, Mr. Fredk. Pinches, who won the Institute silver medal to be presented that evening with some of the drawings by which it is illustrated. The following gentlemen were balloted for and elected as members:—As Fellows: John James Stevenson, M.A., and Andrew Heiton. As Honorary Associates: James Lattey, Edwin Freshfield, M.A., F.S.A., Edward Stanley Roscoe, Morgan Howard, Q.C. (Recorder of Guildford), Rt. Hon. William Henry Smith, M.P. (First Lord of the Admiralty), and Albert George Sandeman.

PRESENTATION OF THE ROYAL GOLD MEDAL.

The Hon. SECRETARY announced that the Marquis de Vogüé, to whom the Royal gold medal is given this year, was unfortunately unable to be present owing to an important family circumstance, but that he had requested M. le Comte de Florian, secretary of the French Embassy, to receive the medal on his behalf.

The PRESIDENT, requesting the Count of Florian to approach the chair, and addressing him, said it was his high privilege to present him, on behalf of the Marquis de Vogüé, with the gold medal annually given by the Queen. The Council, on the motion of Mr. James Fergusson (whose absence that evening he much regretted), had recommended that the medal for the current year should be awarded to the Marquis de Vogüé; this was unanimously adopted by the Council, and also by the general body of members, and had been approved by the Queen. He proceeded to sketch the salient points in the career of M. de Vogüé, stating that his first efforts to explore ancient countries once renowned, but now slightly peopled and little known, were made while he was attached to the French Embassy at St. Petersburg, from 1819 to 1851, when he published some essays on the Ancient Art of Russia. In 1853-54 he visited Greece, Syria, and Egypt, the result of which may be seen in his well-known work on the Churches of the Holy Land, as well as in other minor works on the "Semitic Characters." At the

close of 1861, M. de Vogüé started to join M. Waddington, his great friend, and now one of the most distinguished ministers in the French Cabinet, who had, six months before, explored parts of Central Syria and made important discoveries. Together, during the whole of the year 1862, these travellers visited Central Syria, and soon after their return M. de Vogüé published his book on the Temple of Jerusalem, and commenced the publication, in parts, of "La Syrie Centrale,"—a series of accurate architectural drawings of numerous cities dotting a vast plain, and presenting a chain of monuments illustrative of Early Christian construction between the 4th and 7th centuries of our era. In that exploration M. Waddington, who, members were proud to remember, though a French minister has carried away honours from our universities, and is the son of an Englishman, devoted himself to the study and collection of inscriptions, and M. de Vogüé to drawing and architectural research. Sketches for the plates illustrating "La Syrie Centrale" were prepared by the Marquis, assisted by Mr. E. Duthoit, an architect of distinction; and when circumstances permitted, these illustrations were completed on the spot. This was particularly the case for the drawings of Jerusalem, and for many of those of Djebel Semán. Every detail was measured and figured with the utmost minuteness, and photography was sometimes employed to aid the explorers. But apart from M. de Vogüé's literary and artistic fame, he is familiar to English architects as the bearer of a name associated with the Hôtel de Vogüé—a masterpiece of the Renaissance, situated at Dijon, and not the least instructive of those historical monuments for the conservation of which the French have passed statutory enactments enforced to the advantage of all architectural tradition, and to the special honour of their country. That celebrated residence, inhabited by the father of the Marquis of whom he was speaking, probably fostered a taste for the Arts which, hereditarily transmitted, led the young Melchior de Vogüé to seek occupation for his leisure in lands where the earlier records of history lay, like an open book, to be read by any one who could decipher and understand. The character of these archaeological researches was not ignored by the French Government. In 1871 M. de Vogüé was nominated Ambassador at Constantinople, where he remained until 1875, and where, while devoting himself to official duty, he could still continue his early study of Oriental art—study that a few years before had obtained for him the envied distinction of membership of the Academy of "Inscriptions and Belles-Lettres." In conclusion, the President presented the medal, remarking that upon the brilliant roll of gold medallists, not the least distinguished were the compatriots of M. de Vogüé—MM. Hittorf, Texier, Joseph L. Duc, Lesueur, and Viollet-le-Duc, of whom the first three were, unhappily, dead.

Professor DONALDSON said he wished to add a few words to the address in which their president had pointed out the claims to the esteem of architects possessed by the Marquis de Vogüé as a real archaeologist, and architectural student and author. He wished to allude to the new beauties which archaeological research was able to produce on the buildings of modern times. In Central Syria he had explored and made known to them architecture of a most interesting kind. It was a sterile country, utterly without trees of any large size, and so construction in wood was impossible, and all building must be accomplished in stone. Their temples, houses, and all dwellings were of stone to the minutest point of detail; even the staircases were solidly built in this material, and were made an external feature. These buildings were decorated in a more delicate and purer style of tracé architecture than the temples of the Antonines at Baalbek and Elmirá; but whereas the latter temples were well known, the world was not aware of the existence of these more interesting structures—echoes of a more refined Greek taste—until MM. de Vogüé and Waddington published their great work. Near Aleppo, again, the travellers made further discoveries, and all these had been published in very admirably executed plan, elevation, and section. The drawings were beautifully finished, and had been engraved almost as carefully as it would be possible to do in this country. He wished some of the younger members of the profession would explore the new world of taste and refinement

in architecture which had been opened up to them in his works. He trusted he would be pardoned for mentioning that he had in 1847, when he was secretary of the Institute, the honour of proposing that the Queen be applied to to grant a gold medal. The suggestion was opposed at the time, but he was glad it was adopted, and that it was acceded to by her Majesty. He was further glad to know that it was not confined to distinguished Englishmen alone, but was awarded to the men of all nations, and aided in building all together in the brotherhood of art. The Institute had carried that idea out well; for every third year it was its practice to look abroad and give it to some eminent archaeologist or architect on the Continent. He heartily concurred in the present award to one who had done honour to his country and to his art.

Mr. CHARLES BARRY added a few words expressing his approval of the award, and intimating that other names of distinguished Continental savants were suggested to the council, but M. de Vogüé was unanimously approved.

M. le Comte de FLOURIANS responded (in English) on behalf of the Marquis de Vogüé, thanking the members for the honour they had conferred on him and on his country by the presentation of the medal, the highest honour such a scientific and learned man could aim at. He also gracefully acknowledged the references to M. Waddington's researches. Their explorations of the remains of hygone eras had probably convinced the Marquis de Vogüé and his friend that nothing was lasting in this world but what was good, righteous, and fine. He would again join with the Marquis in thanking them for the honour shown in conferring on him this much-valued distinction.

THE PRESENTATION OF PRIZES.

The PRESIDENT then distributed the medals, prizes, and certificates for the past session as follows, accompanying each with appropriate remarks:—Pugin Travelling Studentship (certificate and £40 to be hereafter presented), awarded to W. J. N. Millard; honourable mention, Frederick Hemmings. The Soane Medallion (with £50 to be afterwards presented under the usual conditions), William R. Lethaby. The Tite Prize (£30 with certificate), E. Sayer; medal of merit, Herbert Alexander Pelly; and honourable mention, Frederic Edwards. The Grissel Gold Medal, G. H. Blagrove. The Institute Silver Medal (with five guineas), Frederick Pinches; honourable mention, Sydney Vacher. The last-named recipient was unable to be present as he is now studying at Florence.

THE ARCHITECTURAL EXAMINATION.

The SECRETARY read the report of the examiners which had been presented that day. In the preliminary class, out of nine competitors four had passed, namely: Wm. Balcombe, of Brighton; E. F. H. Nicholson, Reading; Henry Rennie, Sunderland; and Walter Scott, Holloway. Eight entered for the proficiency class, of whom seven passed, but of these only two passed in both sections, three passed in that of art alone, and two in that of science. Their names were W. Llewellyn Harford, of Manchester; and Bruce G. Capel, who passed in both science and art, and the council recommended the latter for the Ashpitel prize. F. T. Goldsmith, of Newport, Mon.; F. G. Summers, of Nottingham; and W. Jacques, Fenchurch-street, City, passed in art; and T. W. Moss, of Hornsey; and H. G. McLachlan, of South Kensington, passed in science. In the preliminary class one gentleman's examination was so creditable that the council recommended the Institute to award him a prize of some books—this was Walter Scott. It was noticeable, the Secretary added, that both the prize-takers were educated in one office, that of Mr. Rowland Plumb.

THE NEW PREMISES SCHEME.

The PRESIDENT said that as this was the last meeting of the session, he desired to say a few words with reference to the premises improvement scheme. He trusted that at their next meeting in November the members would then assemble in them, enlarged and improved in the manner for which authority was given the council at the general meeting in May. Great labour had been bestowed by the council in the endeavour to make the improvements as perfect as possible, and the suggestions thrown out at

the general meeting had been borne in mind, especial thought being bestowed on the ventilation and warming of the room in which they were sitting. He believed the problems had been solved in a satisfactory manner, and a contract had been entered into, and a new lease arranged with the Architectural Union Company. The contract rather exceeded the sum named at the general meeting, namely £2,000, in fact another £600 or £700 would be needed. As full authority had been given to the council the contract had been entered into, and the matter was now merely mentioned to the members; but he urged the necessity for increased subscriptions. When the improvement fund was started they did not know what was proposed, and now that this was decided upon he trusted many would follow the example set by some who had doubted their subscriptions, and that those who had not given would do so.

Mr. CHAS. BARRY mentioned that two schemes were brought before the council, one involving an expenditure of from £5,000 to £6,000, and that now adopted, and followed up the appeal of the President for further subscriptions.

This concluded the business of the session.

SOME EXPERIENCES OF SEWAGE EFFLUENTS AND BURNING SLUDGE INTO CEMENT.*

DURING the past year it has been my duty to watch the process for purifying the sewage now being carried out at Burnley, in Lancashire.

In a paper which was read by Mr. Richards last year at this Conference, the method of dealing with water-carried sewage by General Scott's system of precipitation by lime, and utilisation of the sludge for cement, was described. This process has now been carried on for nearly eighteen months. The sewage is purified, and the effluent—samples of which have been submitted for analysis to two of the highest chemical authorities—is certified by one to be fit to be poured into a stream of ten times its volume, by the other to be fit to be poured into a stream, having a velocity of at least three miles an hour, of fifty times its volume. Both these conditions are fulfilled at Burnley. This effluent could be further purified at a comparatively trifling cost to towns by intermittent downward filtration, requiring only one-sixth of the land, which, according to the Rivers Pollution Commissioners' 4th Report, unprecipitated sewage requires. The Corporation of Burnley have not required that this should be done, but the injunction against the town has been suspended. In the case of Burnley, the stream into which the effluent is poured varies very much, according to the weather. In wet weather I have seen the Pendle water, as the stream is called, rise several feet in as many hours. I abstain from giving the many analyses I have made of the effluent water, and comparing it to the averages given by the Rivers Pollution Commissioners. A fair average could only be obtained, in my opinion, after daily observations, extending over a year. The rainfall at Burnley is exceptionally high, and the neighbouring hill, the Pendle, collects and pours the rain into the Pendle water. The Pendle water itself rises not far from the small, old town of Colne, and receives the raw sewage as it flows by. It then flows past the townships of Nelson and the village of Barrowford, on the west of the village of Brierfield, from all of which places it receives more raw sewage before it reaches Burnley. A scheme is now under consideration for the federation of these places, in order to bring their sewage to the Burnley sewage works for purification. Should this scheme be successfully carried out, the Pendle water will certainly be one of the cleanest streams in Lancashire. I have several times noticed that the stream is very much dirtier than the effluent poured into it from the Burnley sewage works.

Portland cement is manufactured from chalk or limestone and clay. The component parts of these materials varies very slightly and, therefore, the manufacture is nearly constant. The average analysis of five large manufactories gives the following results, viz.:—Lime, 56·21 per cent.; silica, 24·44 per cent.; iron, alumina, 12·1 per cent. The manufacture of Portland cement from sewage is much more precarious. Sewage, according to my experience, varies in every

place, and during every hour, and consequently has to be carefully watched in order that the requisite quantity of milk of lime may be added. At Burnley, on certain days, large quantities of dye water come down, on other days butchers' refuse, and once or twice we have observed the sewers full of coal-tar and oily refuse; all these facts have to be carefully observed, and only after careful experiments can the quantity of lime necessary to precipitate the sewage be determined. The resultant sludge at Burnley on an average only contains 46 to 50 per cent. of lime, and, therefore, before it is fit to be burnt into Portland cement clinker, more lime has to be added. This is done after the supernatant water has been run off the sludge deposited in the tanks. The sludge has afterwards to be passed through a pug-mill in order that a uniform compound may be obtained. At Birmingham, where Portland cement was also made, the sewage is so capricious that a uniform manufacture could not be guaranteed. This is accounted for by the fact that at certain times very large quantities of acid from the hardware manufactories of the town are poured into the sewers. At Portsmouth, where I have studied the sewage, which is wholly water-closet and house drainage, there is little or nothing to interfere with the manufacture of a high class Portland cement; I believe the same remark would apply to the Lower Thames Valley sewage. The sewage requires only a small quantity of lime to dehydrate it; 16 grains of quick lime per gallon is ample. The sludge I have found generally contains from 53 to 60 per cent. of lime, and, therefore, no fresh lime would have to be added. The fact that at Portsmouth the storm water is partially kept out of the sewers is also greatly in favour of the manufacture of good cement. And in places where the separate system is in force, and where the proportion of water-closets is large, it would be, perhaps, worth while to allow the finely suspended organic matter to subside before lining, and to treat the organic matter described in General Scott's patent.

The sludge resulting from limed sewage may also be burned at a lower temperature than that necessary to produce Portland clinker, and be used to participate the sewage. After this has been done several times, the lime becomes rich in phosphates, and may be profitably sold as a first-class agricultural lime. The cement now being made at Burnley is much improved in quality since the manufacture began, and much has been sold. The latest tests give excellent results. Mr. Deacon, borough engineer of Liverpool, reports the tensile strain of 695lbs. on the 1½ in. square, and that the cement passed through a sieve of 50 meshes to the inch, leaving only 7 per cent. of residue. The latest test at Burnley gives 698lbs. A portion of a sea-wall at Portsmouth has been built with it, and it has stood this test remarkably well. Much has been learned since the process was first started at Burnley, and it may be fairly expected that towns will obtain purification, and at the same time will recover the greater part of the cost of so doing, by adopting this process.

CHIPS.

At the Metropolitan Board of Works, on Friday, an application of the Greenwich District Board for permission to borrow £2,460 to defray cost of erecting stables, cart lodges, and disinfecting apparatus on their premises at Deptford, was granted to the extent of £2,400, and permission was also given to the vestry of Shoreditch to borrow £10,000 for the purposes of the Sun-street improvement. It was proposed to contribute a sum not exceeding £2,000, being one-half the estimated cost of an improvement proposed by the vestry of Shoreditch by the opening up of Harwar-street (late Thomas-street).

At the meeting of the West Ham Local Board, held last week, Mr. Angell, the surveyor, submitted plans for the carrying out of the first section of a scheme of surface drainage for the parish; this would extend from the "Princess Alice" at Upton, along the Romford-road and Stratford High-street to Bow-bridge, and its estimated cost would be £9,000. Two other sections will hereafter be prepared, the total estimated cost being £25,000. The scheme was adopted, and the surveyor was requested to obtain tenders for the execution of the work.

The *Lealtad*, a Madrid newspaper, reports that the Alhambra is in imminent danger of destruction. It states that during the last days of May the hill upon which the choicest relic of Moorish art stands shows signs of an approaching landslide, and since then the appearances of collapse on a colossal scale have increased.

* Contributed to the Recent National Water Supply and Sewage Conference by GRANVILLE COLE, Ph.D.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

ST. PETER'S CHURCH, BOURNEMOUTH.

ST. PETER'S CHURCH, Bournemouth, has been very many years in course of building. There was a mean building in the first instance, to which an aisle of not very much better character was added on the south side, and the church was in this condition when Mr. Street began the reconstruction of it. A north aisle and arcade were first of all erected, then the old south arcade was taken down and rebuilt, and a clerestory added to the nave. Then a chancel of consistent size and character, with eastern transepts, chancel aisles, and upper and lower vestries, were erected, and the church being still not large enough for the increasing congregation, western transepts were added, and a western tower. The church is now, therefore, one of unusual scale and variety of character. It owes a great deal, no doubt, to the fact that its scheme has been developed by degrees and to meet requirements as they arose. The spire is now in course of erection by Messrs. Wall and Hook, the tower having been built a few years back by Messrs. Dove Brothers. The church is about 170ft. long inside: the chancel being 50ft., and the nave, exclusive of the tower, 98ft. The width of the nave is 53ft., the height of the tower 98ft. and the tower and spire, when finished, 200ft. There is an elaborate south porch. The tower and chancel have groined roofs, and the decorating in the way of painting on the walls and the stained glass in the windows are very elaborate. The churchyard crypt is an important feature in the churchyard, being of large size, and having on its base the crucifixion and three other sculptured subjects. The churchyard of this church is probably the most beautifully kept and arranged churchyard in England. The extensive value of the works which have been done in this and other dependent churches in Bournemouth is owing entirely to the zeal and energy of the vicar, the Rev. A. M. Brunett, who has seen the place increase from a village to a town of some importance during his incumbency.

"THE SCHOOLS," OXFORD.—INTERIOR OF GREAT HALL.

THE illustration shows Mr. T. G. Jackson's design for the great hall fronting High-street, which forms the vestibule and principal waiting-room of the building. The hall is to be panelled and ceiled and roofed with oak, and a stone arched gallery springing from stone brackets runs along the inner wall to afford a passage for examiners on the first floor. On the ground floor the hall opens by three large elliptical arches into the main corridor, beyond which are the *ried rooe schools*, ranged round the inner quadrangle. The building is now well advanced, part being roofed in, and the rest raised to about

two-thirds of its height. We illustrated Mr. Jackson's design by perspective of High-street front and bird's-eye view of quadrangle, together with ground and first floor plans, on December 22, 1876—p. 622, vol. XXXI.

ROYAL ALBERT ASYLUM, LANCASTER.

We gave a single-page illustration of this building in the BUILDING NEWS of Oct. 9, 1874, and a full description at the same time. The present illustration is, however, a much superior one, and is, moreover, accompanied by a complete plan. The building, which will accommodate 600 inmates, cost £63,742. The exterior is built of a local light-coloured freestone, relieved with red stone. The roof are covered with Coniston green slates. Messrs. Paley and Austin, of Lancaster, were the architects, and Mr. John Combe the clerk of works.

END OF HALL FOR C. NOSOTTI, ESQ.

The illustration shows design for end of hall, and includes gallery, staircase, &c. The wood-work to be in oak (stained), panels in frieze, and ceiling to be in carton pierre and gilt; tapestry under side arches, and panel between windows; walls above dado in plain colour. It was designed for C. Nosotti, Esq., of Oxford-street, W., by Mr. C. Gill, and exhibited in the present R.A. Exhibition.

THE BELFRY, CHRIST CHURCH, OXFORD.

The drawing shows the new stonework of the tower as recently completed. The upper part of the belfry it is intended to have carried out at a future time. It would be of open work constructed with timber, covered with lead or copper, and is an essential part of the design. The four turrets need this central feature, and indeed without it the design is wholly incomplete. Such a finish is much needed in order that the belfry should compose well with the lead dome of the entrance gateway, and with the spire of the cathedral. It is to be hoped that this, so essential a completion to the design of the belfry, may be added at no distant time. The stonework of the quadrangle has been restored. It was in a state of much decay. The walls were finished with a balustrade of Georgian date. It was so decayed, and, indeed, in a dangerous state, and would have had to have been reproduced in new stone. Instead of this a new parapet with battlements has been put, as being more in accordance with the work of the original building. The work has been carried out under the direction of Messrs. Bodley and Garner, of 14, South-square, Gray's-inn; Mr. Fitzwilliam acting as clerk of works.

HOUSES IN CADOGAN-SQUARE, CHELSEA.

MR. R. NORMAN SHAW's principal picture at the Royal Academy last year is that which we have reproduced among our illustrations to-day. The subject is one of the author's most happy designs, in the Free Classic sort of style which, against all comers, he has continued to uphold as his own, and it represents the houses in Cadogan-square now nearly completed. Mr. Shaw has sent us no particulars, treating the matter as one of no more interest than ordinary town houses in red brick and tile.

MANSION FOR RT. HON. SIR ROBERT COLLIER, CHELSEA, S.W.

THIS house is built on the Thames Embankment facing Battersea Park, on a site reclaimed from the Thames by the Metropolitan Board of Works. It has a frontage of 60ft., and a depth of 112ft. The accommodation of the second and first floor is shown on the plans; on the second, third, and 4th floors are nine bedrooms and dressing-rooms, two nurseries and lumber-rooms. In the basement are the usual offices, including kitchen, scullery, larders, butler's pantry and bedroom, men-servants' rooms, servants' hall, house-keeper's-room, store-room, wine-cellar, &c. The house is built in brick, with picked London stocks for facing; the moulded quoins and heads to windows being in red brick; the cornices, tympana of gables, and other decorative work are in terra-cotta, being supplied by the Architectural Terra-Cotta Company, Maplin-street, E., the whole of the work having been specially made from the architect's designs. The work has been carried out by Messrs. Kirk and Randall, of Woolwich, from the designs and under the superintendence of Mr. R. Phené Spiers, F.R.I.B.A., architect, of Arthur-chambers, Regent-street. Mr. Gale was the clerk of works. A water-colour view of the house is at the Royal Academy this year.

EDINBURGH UNIVERSITY.

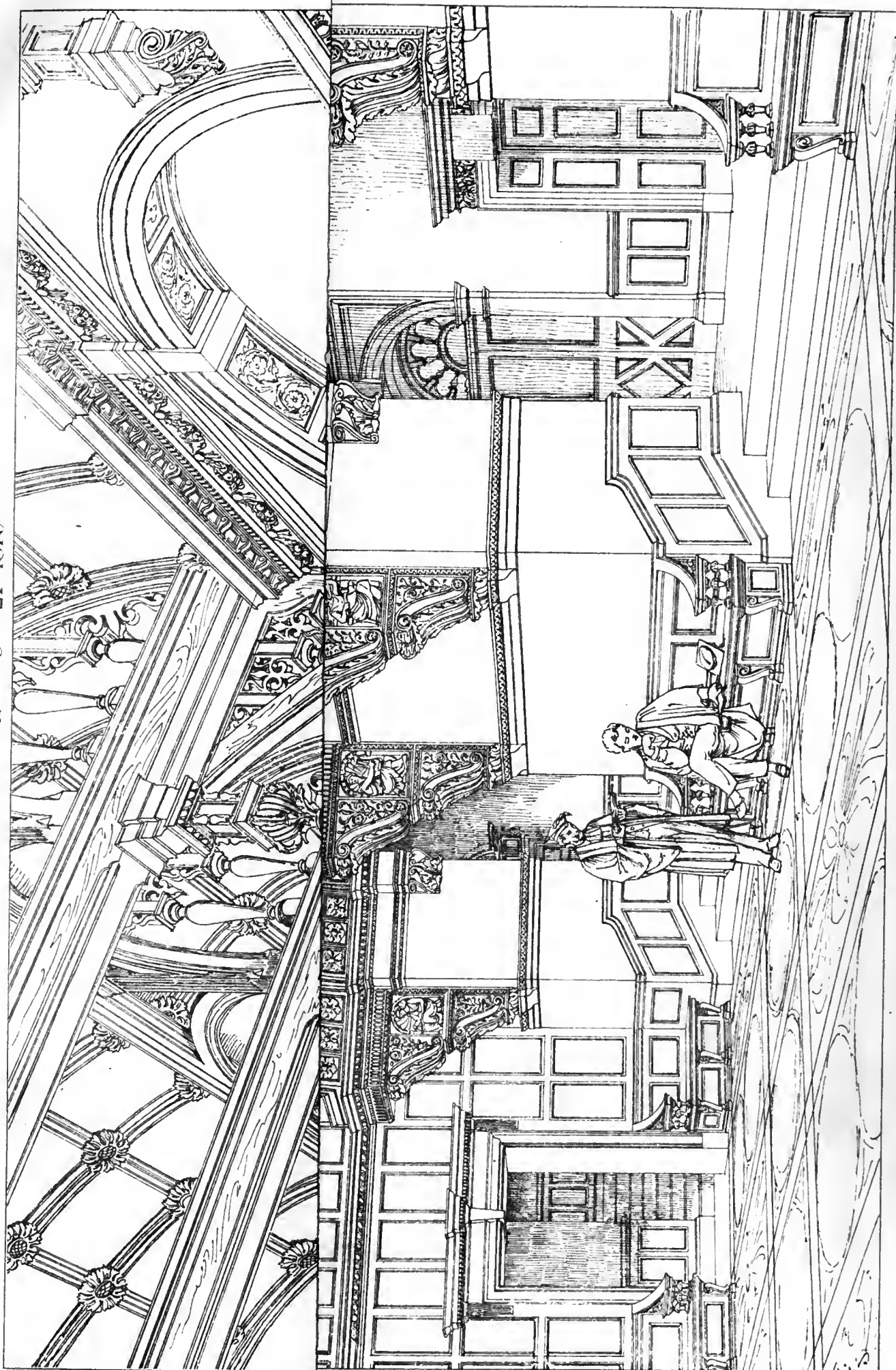
OUR illustration of the new buildings for the Edinburgh University, which we publish to-day, is taken from the drawing exhibited this year at the Exhibition of the R.S.A., excepting the plan, which we have included in the plate. Mr. Robert Anderson, of Edinburgh, is the architect, and he has chosen the Italian style of the Cinque Cento period, which was developed in the end of the fifteenth and beginning of the sixteenth centuries. The principal entrance is through the archway, under the central projecting bay of the main front, to the N.W. of which is placed the great campanile, with its pyramidal roof. A colossal statue surmounts its apex, at a height of 250ft. from the ground. The common hall is semicircular on plan, and has its façade diversified at regular intervals with massive buttresses, in which niches are cleverly arranged for statuary. Considerable skill has been shown by allowing the character of the building to express itself in the treatment of the several frontages, to each of which a picturesque variety has been secured, without any sacrifice of a general balance of parts. The furnace-shaft, which rises in the anatomical court from the heating-furnaces, has been architecturally treated. The general distinction of the several departments is clearly shown by the plan which we give to scale.

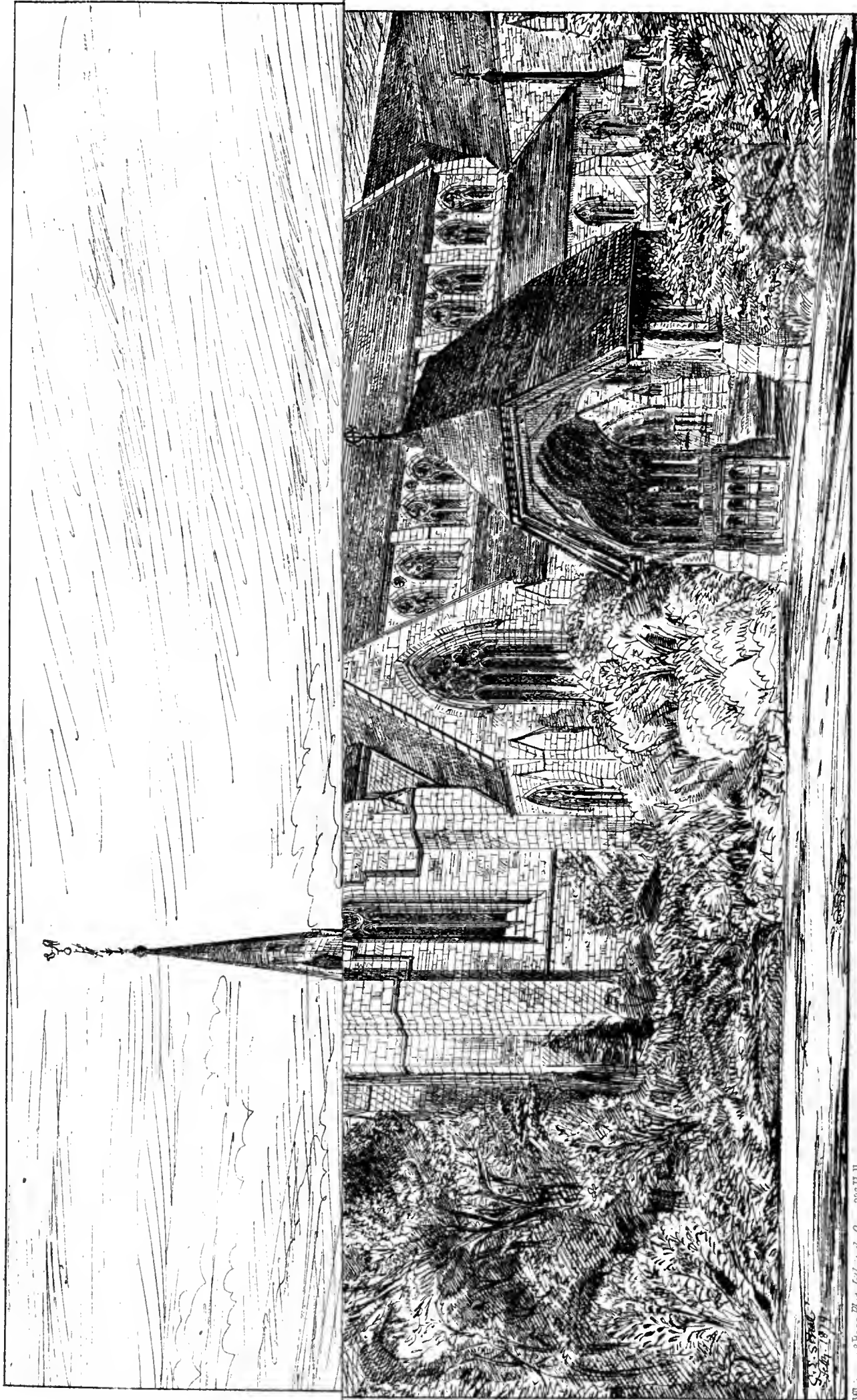
THE COUNCIL-CHAMBER, WAKEFIELD TOWN-HALL. THIS illustration represents the interior of the council chamber of the Wakefield Town-hall, of which Mr. T. E. Collentt is the architect. It is proposed to cover the lower portion of the walls as shown on the drawing, with an American walnut dado, slightly polished, and above that have raised plaster decorations, adapted from some fine old leather raised work in the possession of the architect. At the lower end of the room is the lobby of the principal entrance, and space for reporters, the gallery for the public being above. The chairs and tables are to be in American walnut also. The painted panel to fireplace was suggested by Mr. T. W. Linton, and is taken from "Henry VI." We may here state, with reference to the paragraph which appeared last week on p. 706, that the architect informs us that there has been no estimate for fittings, &c., and consequently the amount has not been exceeded as was stated.

DESIGNS FOR AIR-PUMP VENTILATORS.

THE air-pump ventilator, manufactured by Messrs. Robert Boyle and Sons, of Glasgow, is well-known to most of our readers. Its intrinsic merits have been described by us some time ago, and its adoption by the late Sir Gilbert Scott, Mr. Arthur Cates, and other leading architects, has in every case been attended with satisfactory results. Satisfied with the principle of their ventilator, Messrs. Boyle and Son have evidently recognised the fact that in the majority of cases the adoption of such contrivances has almost invariably marred the exterior of the buildings to which they have been fixed. We are but too familiar with the hideous additions to roof exteriors, added without consulting architects, under the plea of ventilation, and we think the idea of Messrs. Boyle and Son in publishing the sheet of designs which we publish to-day was a good one. The sketches prepared by Mr. Maurice B. Adams show at any rate that henceforth pure air may be enjoyed without offence to art—rather in fact furnishing a justification for the addition by the architect or builder of an ornamental feature to his building. At the same time economy has been studied as in the first design shown, which is meant to bring the ventilator within the reach of all, and is, so the makers inform us, twenty per cent. cheaper than any similar contrivance. The other sketches are of course simply suggestive, with the exception of the centre illustration, which represents the manner in which Messrs. Boyle and Sons' ventilator has been adopted at Christ Church, Lambeth. It may be interesting here to append the result of its use in that building. Some time since Mr. H. J. Paull, the architect, the builders, and others interested, tested the ventilator during the service; when it was found to be extracting air at the rate of 8,000 cubic feet per minute, or 480,000 cubic feet per hour. There was but a moderate breeze at the time. During the whole time the experiment lasted there was not the slightest draught experienced, nor was there at any of the other experiments, of which there were several. The Rev. Newman Hall, in a letter to a friend, referring to the ventilation of the church, says, "I consider our ventilators very successful."

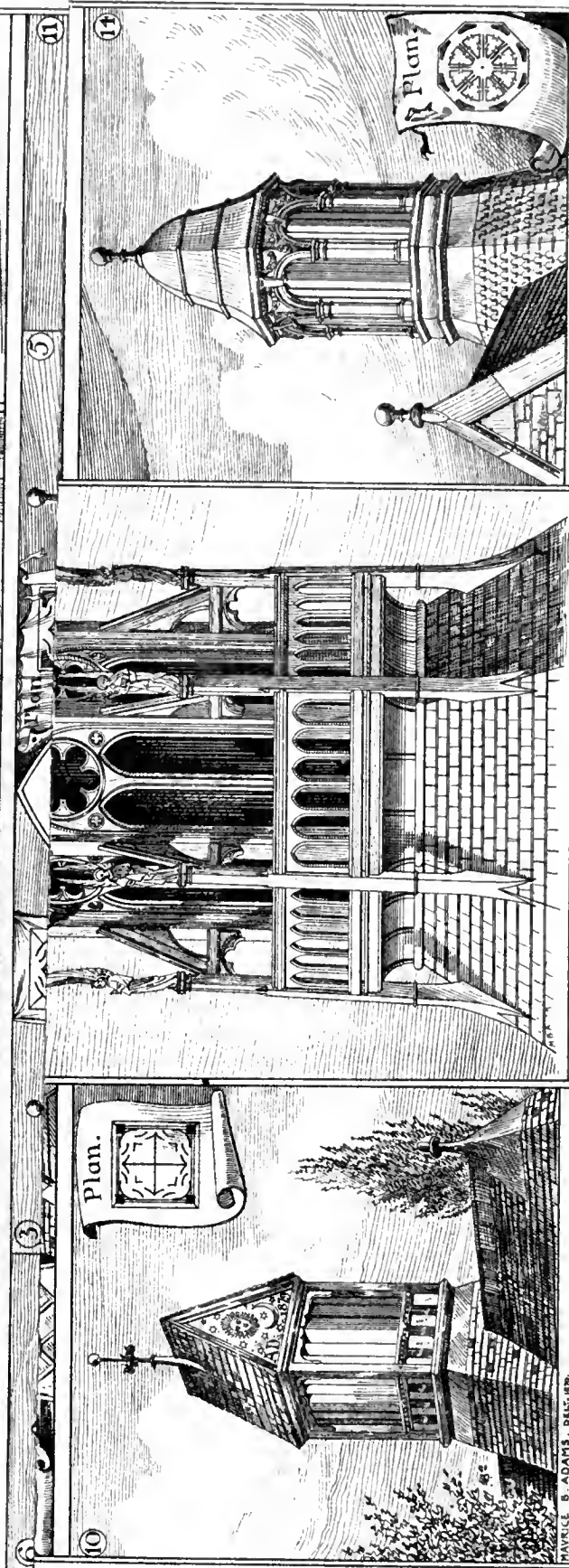
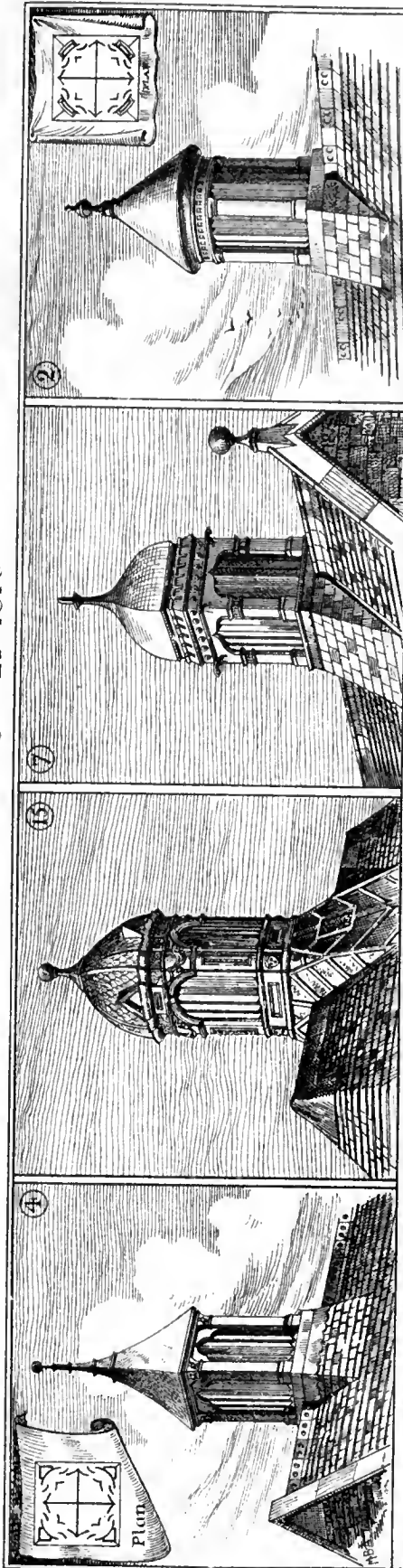
THE BUILDING DEWS, JUN. 27 1879





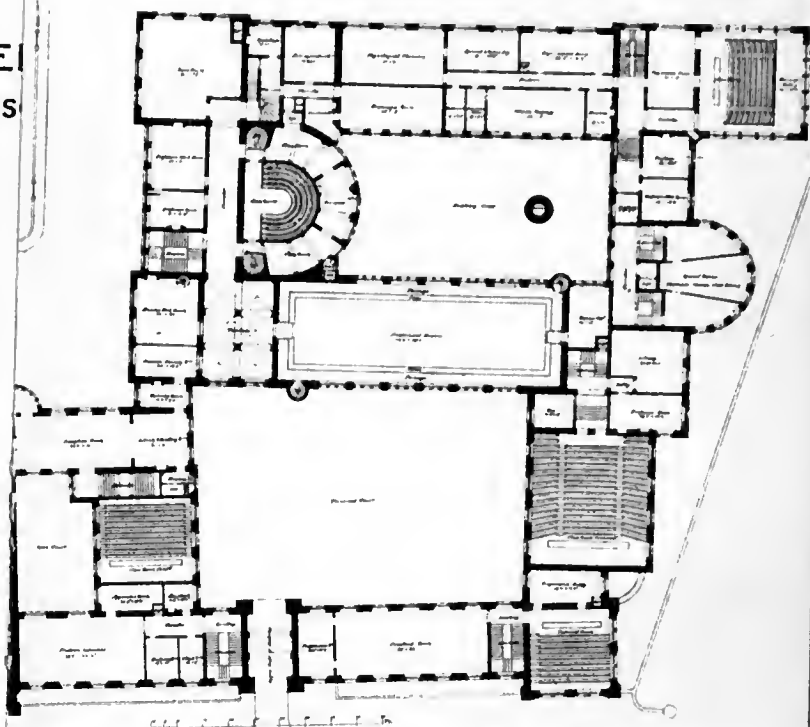
Whitman & Bass, Photo-Litho to the Queen, 236, Holborn.

G. E. Street, R.A.,
Arch.

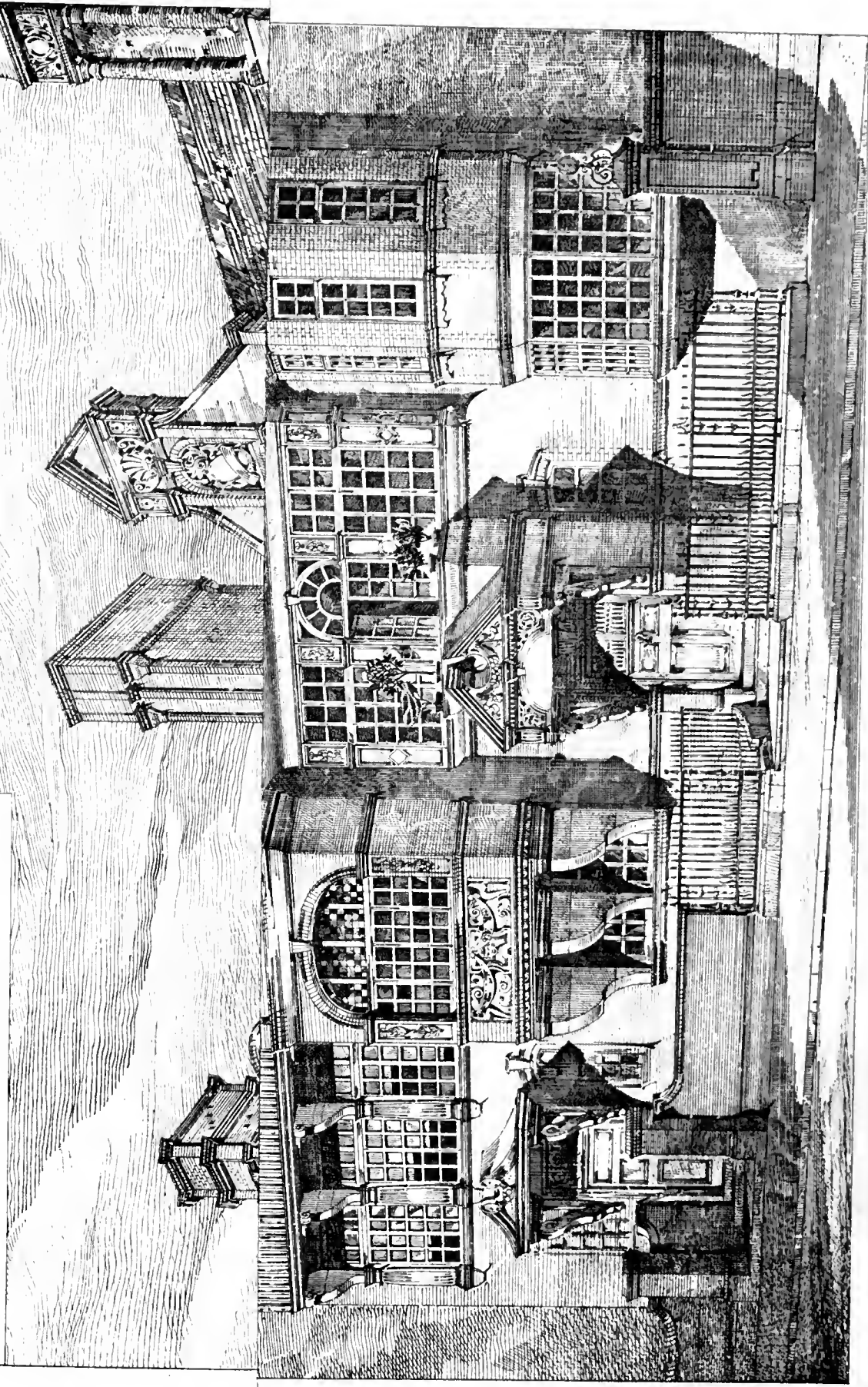


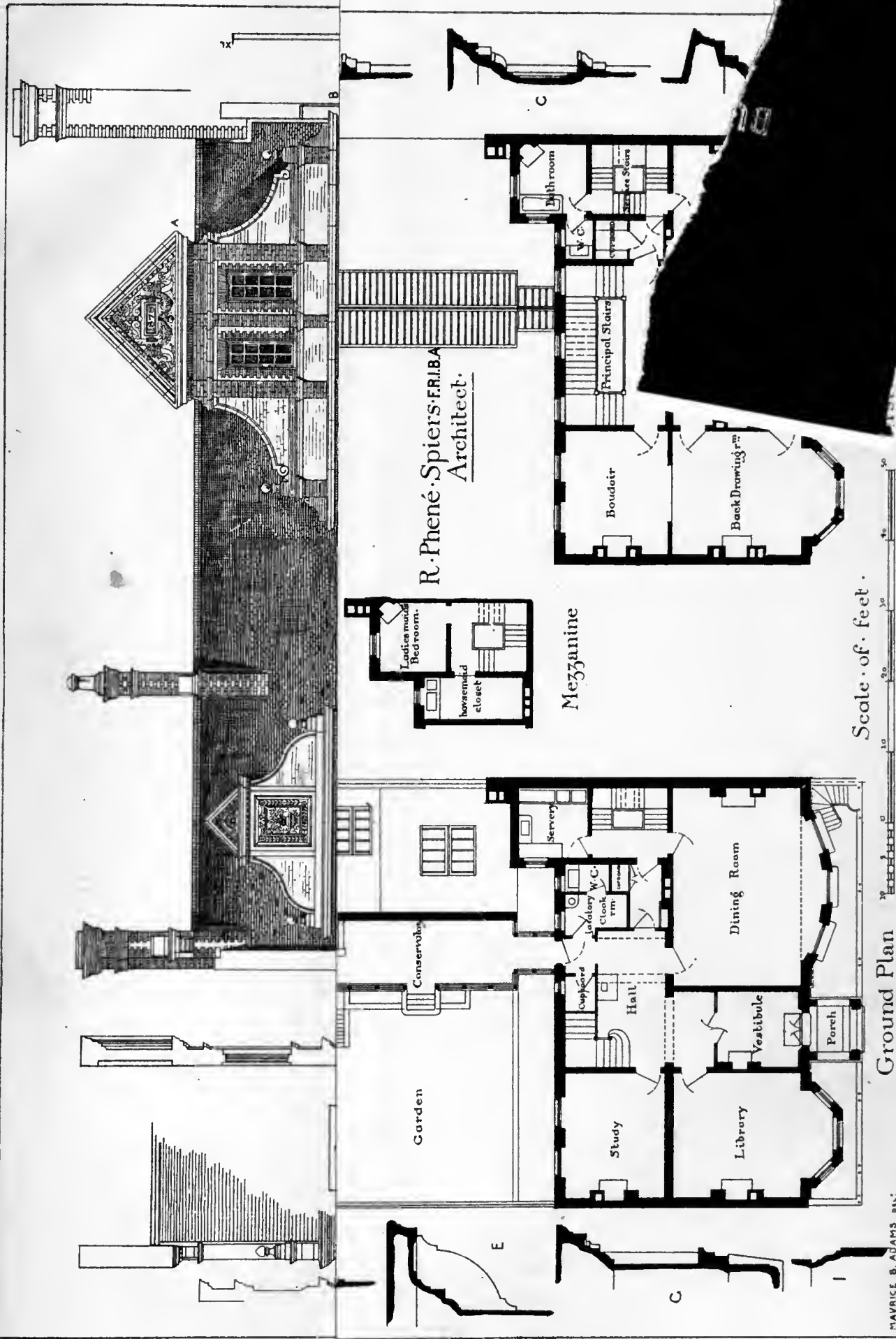
<p>Soil Pipe Ventilator</p>	<p>No. 1 Plain Ventilator</p>
<p>ROBERT BOYLE & SON'S HEAD OFFICE GLASGOW</p>	
<p>PATENT SELF-ACTING AIR-PUMP VENTILATORS.</p>	
<p>GLASGOW, 110-Boothwell-Street. LONDON, 7-Mansion-House-Buildings MANCHESTER, Exchange-Arcade</p>	
<p>Can be made in WOOD and IRON to any Architectural Design; fit into turrets; towers &c. They have no Mechanical movement and are entirely free from down-draught. EXAMPLES DESIGNED BY MAYNICE B. ADAMS, A.R.B.A.</p>	

EDINBURGH UNIVER
ROBERT ANDERS
ARCHITECT



Houses in Cadogan Square, Chelsea.
R. Norman Shaw, R.A. ARCHITECT.





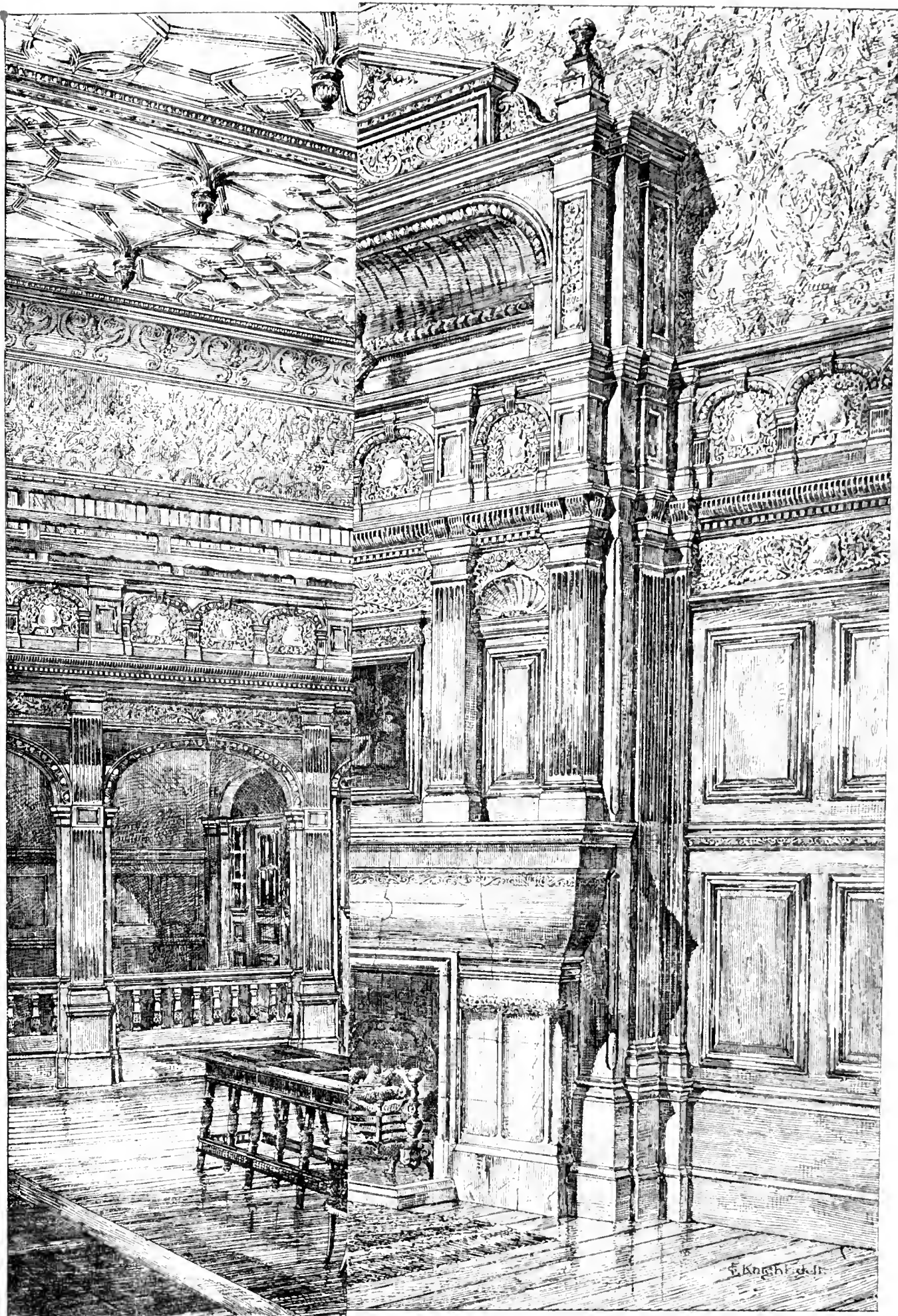
R. Phené Spiers, F.R.I.B.A.
Architect.

Mezzanine

Scale of feet.

Ground Plan

MAVRICE B. ADAMS DEL.



Engraved & Printed by James Agnew & Sons, Queen Square W.C.

New Belfry·Christ·Church
OXFORD

G·F·Bodley & T·Garner·
Architects

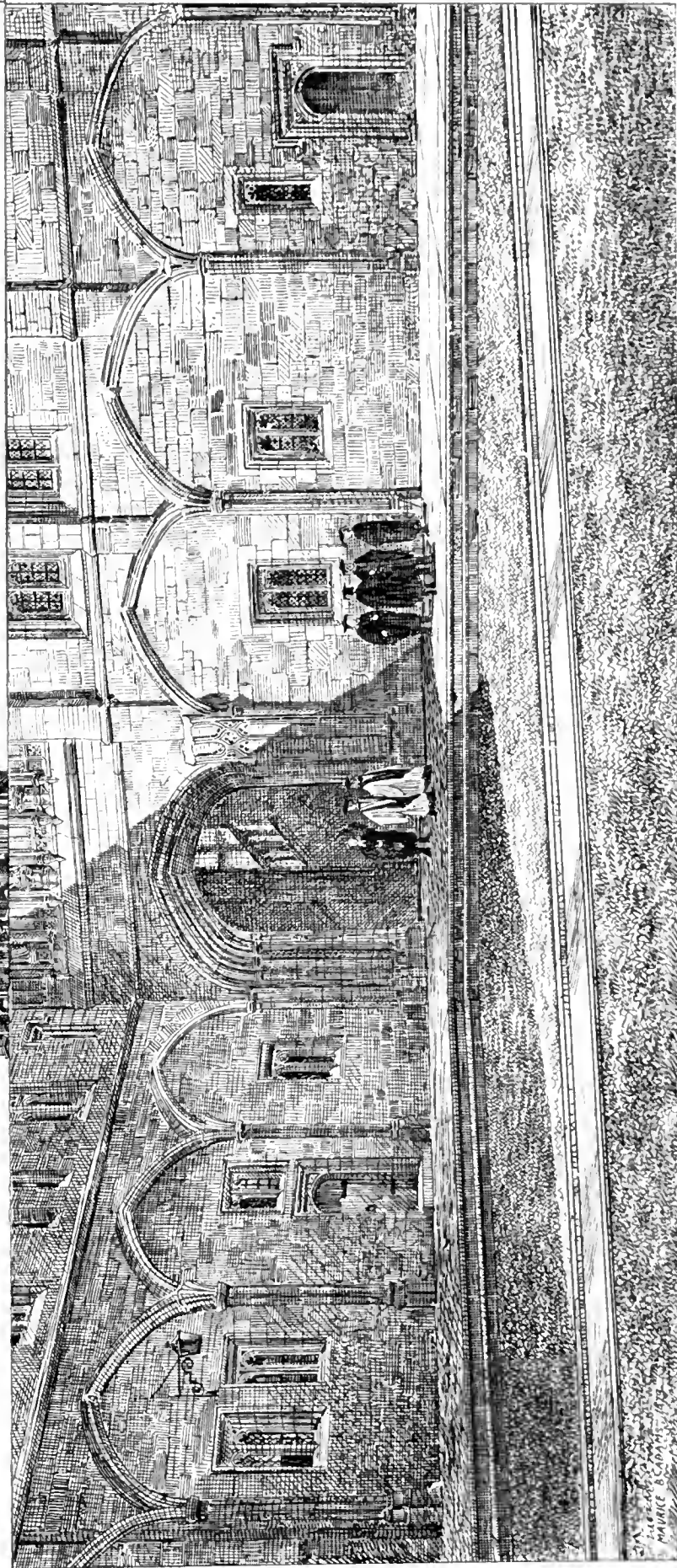
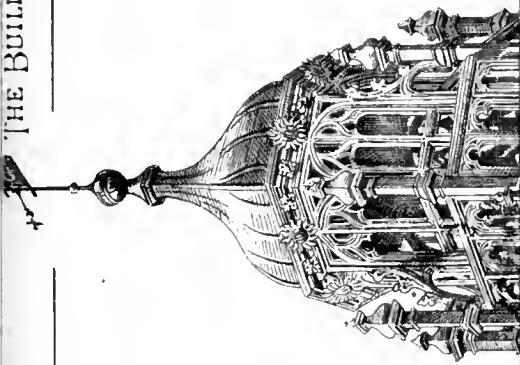


Photo Lithograph of a Printed by James A. Newman, 6, Queen's Square, N.Y.

OUR COMMONPLACE COLUMN.

HOSPITAL

FROM *hospitia*, a term also applied to the mediaeval leper hospital. We confine our attention here to hospitals for the reception and treatment of the sick and hurt, sometimes called infirmaries. Of the London hospitals, St. Thomas's, founded in 1553, St. Bartholomew, in 1546, and Bethlehem, in 1547, are the oldest. As a fair example of a town hospital, the Middlesex hospital, in the parish of Marylebone, may be cited. It is disposed in the form of a letter H, and comprises 310 beds, of which 120 are for medical, and 190 for surgical cases. Three wards are set apart for patients affected with cancer. There are resident house surgeons, an apothecary, and a chaplain. In the planning of hospitals, the first essential is the separation of the administrative portion from the hospital proper. The administration offices should be central so as to facilitate service to the wards, and in the best modern hospitals those offices are placed in a block arranged upon a central axis, the waiting and surgeons' rooms being in front. There are two well-known principles of arrangement, namely, the "pavilion" and the "barrack" systems. The first-named plan is that now generally considered the best: the wards form self-contained separated blocks, placed in parallel rows, and connected by a central or end corridor. It is best to place the pavilions about 100ft. apart, in parallel lines with their axes nearly north and south, connected by long corridors. In the centre the administrative building should be placed, and this has sometimes detached blocks or pavilions for private patients on each side. The acute cases should be separated from the chronic and convalescent ones, as patients suffering from acute fever require a lower temperature and less light than those with chronic rheumatism or suffering from debility. Acute cases may be estimated at 25 per cent. of the total number. The wards may be 96ft. long, by 26ft. wide, and contain 24 beds—12 on each side. Windows are placed opposite to promote cross-ventilation. In good wards 100ft. of floor-space to each patient is necessary, the beds having 8ft. of wall-space. The smaller wards for separate cases may be attached at one end of the longer ward on one side of corridor, while on the other side may be placed the nurse's room, dining-room, and kitchen. At the other end of ward the bath-room and water-closets should be attached with an isolated lobby. In a work published in America, entitled "Five Essays Relating to the Construction, Organisation, and Management of Hospitals, Contributed by some of the leading Physicians for the use of the Johns Hopkins Hospital of Baltimore," reviewed in our pages (see 2nd Vol. of BUILDING NEWS for 1876, p. 361, *et seq.*), several suggestions are embodied. Some authorities recommend the temporary or tent hospital principle favourable for infectious cases, but the buildings upon this plan cover a large area and are only suitable for military uses where land can be obtained cheap. Others prefer one-story wards for 20 to 30 patients, so that ridge ventilation may be secured. These may be square-shaped, 56ft. by 43ft. for 23 beds, with a central chimney-stack and stoves on two sides, a similar plan being adopted at the Massachusetts General Hospital. A bay-like projection on the south side affords a useful recess in cold weather. These blocks are strung together by a transverse corridor at their north end, on the other side of which are the dining-rooms. No doubt where land is unlimited the one-story pavilion is the best, but the two-story pavilions are more economical in construction. Another suggested plan for one-story pavilions is to arrange them in parallel rows, 65ft. apart, with the administration block between. Each ward is made 90ft. by 30ft., with service blocks 50ft. long by the same width (see BUILDING NEWS for 1876, Vol. XXXI., page 563). Generally 20 to 24 patients in a ward are considered sufficient.

The space allowed by the Poor Law Board for civil and military hospitals is 850 to 1,200 cubic feet per man, but for new hospitals 1,300ft. per patient, and 1,500ft. in acute cases is recommended.

The octagon plan of ward has been strongly recommended by some authorities, as it turns more flanks to the air and sun than any other; the corridors should always be placed on the north side of wards. For the suggested plan of the John Hopkins Hospital we refer our readers to an article and block plan that ap-

peared in the BUILDING NEWS, Vol. XXXI., page 463. The block arrangement consists of a U-shaped connecting corridor, upon each arm being strung the common and service wards; these are placed transversely, their axes being north and south. At the ends of the long corridors are two isolating wards for dangerous patients, for 20 beds each. The administration building is attached to the front corridor, and is isolated at the sides, while two short advancing wings in front are devoted to the male and female patients' pay wards. The offices and house dispensary are in the centre behind the front corridors; the operating theatre, kitchen, and laundry building are detached buildings on the north side, the kitchen and laundry being approached at the end of the front corridor. Isolated tents are placed along the south wing, though completely outside. For details and plans we refer the reader to back volumes of the BUILDING NEWS, also to the work above quoted, and to the Local Board Regulations of Hospitals.

The following contribution is sent by "C. F. W.":—

"Hospitals," says a writer in Weale's "Dictionary of Architecture," &c., "were originally designed for the relief of poor and impotent persons, and the entertainment of travellers upon the road, particularly of pilgrims, and therefore they were generally built upon the roadside. There existed in England above 358 of these houses of relief." Under the title of "Hotel Dieu," M. Viollet-le-Duc gives an interesting and critical article on hospitals. He remarks that there is nothing to prove that certain houses were set apart by the ancients for the relief of the sick. At Athens wounded soldiers were provided for at the expense of the republic, but this was probably nothing more than a pension, and no other Greek town appears to have had it. The Romans had set apart places in the country for invalided men and horses; no authority, however, mentions the existence of a building devoted solely to the wounded and indigent sick.

St. Jerome the First speaks of a certain very rich Roman lady named Fabiola, who founded (c. 380 A.D.) an hospital for the sick, who until that time lay neglected in the streets and public places.

At the beginning of the Middle Ages, in the towns of Italy, France, and Germany several establishments were formed for taking care of and harbouring the sick, travellers, and the poor.

During the 11th, 12th, and 13th centuries an incredible number of hospitals were founded. Almost all the abbays had a hospital within their precincts, in addition to a large number of lazar houses established outside of towns and cities. It has been computed that there were no less than 19,000 lazarettes in France, Germany, England, Italy, Spain, Brabant, Switzerland, Hungary, Poland, Bohemia, and Denmark.

In concluding the article, our learned author says that the buildings are of a monumental aspect, without being rich. The patients have space, air, and light. They were separated from one another, as may be proved; their individuality was respected. It is doubtful whether one spacious room for a number of patients is advantageous. Often the suffering of each patient is increased by the sight of that of his neighbour. Without claiming that the cellular system was frequently adopted in the Middle Ages, it is certain from a moral point of view that it presents an advantage. We believe that our hospitals owe their origin to a sentiment of very noble charity which was present in the hearts of their constructors and founders.

Mr. Dollman, in his preface to "Domestic Architecture," makes some valuable remarks. "In examining the plans of various buildings illustrated in the present work, the component parts that appertain to all of them will be found to consist of an audit room, occasionally with a muniment room adjoining a suite of apartments, more or less extended for the master or chaplain, an infirmary for the sick, and, lastly, a chapel, which, with becoming significance, was always more ornamental in character than the other buildings. The first, and that perhaps of which the characteristics are the most definite, is to be found in those instances where the abodes of the inmates were all under one spacious roof, the area being subdivided into small dwelling-rooms or dormitories. The hall communicated directly with the chapel beyond, from which it was only separated by an open screen, thereby affording

an opportunity to the sick and aged of hearing the recital of the Church's Service, from which, supposing the chapel to be a distinct building, they would otherwise have been debarred; as examples, we may mention the Bede Houses, at Stamford and Higham Ferrars, and St. Mary's Hospital, Chichester. The second kind is where the dwelling-rooms for the inmates were, as before, under one roof, but the chapel, though undoubtedly contiguous, was a distinct building entered from without, as at St. John's Hospital, Northampton. A third variation is where the abodes of the inmates formed one continuous suite of buildings, sometimes within a quadrangle, but not, like the foregoing, included under one roof, the church or chapel being altogether distinct, but connected with the hospital buildings by an ambulatory or cloister, or by a short covered way only, as at St. Cross, near Winchester; Ewelme, Oxon; Cobham, Kent. A fourth mode of arrangement, differing somewhat from the foregoing, is to be met with in the case of Ford's Hospital, Coventry, where the plan consists of a central open court on each side of which are almoners' abodes, at one end of the quadrangle the common hall of the hospital, and facing it at the other end the chapel.

It is worthy of note that with the exception of St. Mary's, at Chichester, the chapel of which is of Geometrical Middle Pointed character, and the church of St. Cross, which is chiefly Transition Norman, none of the examples are anterior in date to the third Pointed or Perpendicular Period; the domestic portion of the hospital, if they existed in the same style, have been entirely destroyed.

We will conclude this article by quoting, or rather condensing some practical remarks from Dr. Oppert's volume on Hospitals.

Formerly large hospitals were founded on the principle that by increasing the number of patients who could be accommodated, the benefit conferred on the sick poor of the community was also increased; but in recent times contrary views are strongly maintained. Large hospitals are described as unhealthy and dangerous to those who seek recovery of health in them. It is stated that a great many sick people living together under one roof engender certain diseases which are well known under the term of hospital diseases. In selecting a site the following are the chief points to be observed:—1, the general healthiness of the locality; 2, the easy accessibility for patients and others who visit the hospital; 3, convenient position for clinical instruction; 4, cost of erection and maintenance.

If one side looks south-east, the other faces north-west; and this seems to be the best position (except in cases of wards for diseases of the eye, where the patients require as little light as possible). Their wards may be northwards, but all other patients want light and sunshine.

Whatever may be the style of architecture—Gothic, Italian, or mixed—I should not object to a fine clock-tower and an ample porch; the chimneys need not look ugly, and narrow entrance doors can be avoided.

The architect ought to dispense with arched windows. The material of which the walls are built should be good bricks. If the walls are to be plastered, it is better to leave that until about a year after the completion of the building, for the wall to get thoroughly dry; and it is better to plaster or cement them first inside and then outside, because if the outside is left open to the drying action of the atmosphere the inside walls retain less humidity.

The plan of a circular building is as bad as the closed quadrangular. A better one is where one side of the court is open. There the air is less stagnant, because the wind can sweep through from one direction. The wings and centre may form one long block; this is better still. They may assume the shape of the letter H (Middlesex Hospital), where the administration part is in the centre, having the wards for males on one side and those for females on the other.

The hospital may be built in such shape that the letter L (Sheffield Royal Free) or T (St. Mary's, Oxford) is formed, and in both cases staircases may break the communication of the different parts from the whole.

Several plans may be combined; but in no case can the free circulation of air, which is necessary to keep the hospital healthy, be more favoured than in the Pavilion plan. Here each block is a hospital by itself, and yet is connected with the others.

As to the relative position of the different

parts of the hospital, the following should be observed:—

First the offices for administration, the sleeping-rooms of the officials, medical men, nurses, &c., must be separated as much as possible from the wards.

Secondly, the kitchen must not be in the basement or ground-floor but quite separate, connected with the main building by a corridor.

The engine-room should be in a separate shed; washhouse and deadhouse should be detached.

Male and female patients should be accommodated in separate parts of the hospital divided by the principal yard; and they should not use the same day-room.

There should not be more than two floors in a building intended for a hospital. It will be generally found that the best plan is to give additional height to those parts of the building where the offices are situated, and to have fewer floors in that portion devoted to clinical patients.

METROPOLITAN RAILWAY EXTENSIONS.

AN important extension of the Metropolitan and St. John's Wood Railway to Harrow is now in course of construction. It commences, according to the *Engineer*, by a junction with the existing tunnel under the Finchley-road, about 500 yards north of the Swiss Cottage Station. The present tunnel will be lengthened about 80 yards, and at its mouth a station will be erected, opening on to the Finchley-road. Half a mile further on the line passes under West End-lane, where there is to be another station, which is already in an advanced state. It next crosses over the Hampstead branch of the London and North-Western Railway, a work of considerable difficulty, as that line is itself formed on an embankment about 25ft. high, and the foundations for the new bridge had to be carried down through this embankment to the solid ground beneath. A second opening is also provided so as to permit of the widening of the London and North-Western to four lines of rails at a future period. For the next quarter of a mile the new line is carried on a viaduct consisting in the main of semicircular brick arches of about 30ft. span, but having also four larger openings at the points where it crosses the Iverson-road, the Loveridge-road, and the Edgware and Christ Church-roads. The two first-named roads are crossed by noble brick arches built in ribs of blue Staffordshire bricks set in cement, the spans on the square being respectively 104ft. and 84ft., and the heights from the roadway to the under side of the arch 28ft. and 23ft. The Edgware and Christ Church-roads are also crossed by large arched bridges with spans of 80ft. and 70ft., and headways of 20ft. and 17ft. respectively, but in these cases the material employed is cast-iron, as the headway at the disposal of the engineer did not admit of brick arches. It is proposed to place a third station at the Edgware-road, and every exertion is being made by the company to have this, as well as the two other stations before mentioned, sufficiently completed to enable them to open the line up to this point in time for the show of the Royal Agricultural Society of England, which is to be held in the immediate neighbourhood.

After crossing the Edgware-road the line enters upon what is at present a more rural district, although the land from this point to the river Brent, near Kingsbury-bridge, is rapidly being laid out for building, and will soon constitute another suburb of the metropolis. A considerable extent of land has been purchased by the railway company in this district, part of which will be used for the erection of locomotive shops, of which the company stand in great need, and the rest will be sold off for building purposes. The United Land Company has also just laid out a considerable estate for building, and the other landowners are more or less following their example. Stations will be provided at once at Walm-lane and the village of Neasdon, and land will be reserved for the erection of another and intermediate station when the growing traffic requires it. The works on this section are in a forward state. On the remaining portion of the line, from Kingsbury to Harrow, the works are only just commenced, but as the greatest part of the land has now been arranged for, they will soon make good progress. The com-

pany's station at Harrow will be a mile nearer to the town than the present one on the London and North-Western Railway, and at a much higher level, which will be a great boon to the inhabitants. A somewhat peculiar system of construction is adopted at Iverson-road. The bridge, instead of being built on the skew system, consists of a series of vousoirs ribs stepped back behind each other on one side and advanced on the other. The method of construction is simpler than that usually adopted, and no doubt equally efficient. Mr. Charles Liddell, Abingdon-street, Westminster, is the engineer, and Mr. Joseph Firbank, the contractor for the works.

CHEAP LOCKS.

WHETHER or not the Americans are beating our own lockmakers, as some have recently thought, it is evident they are alive to the defects of the ordinary common lock and its appendages, and not backward in suggestions for its improvement. The *American Builder* says:—"Cheap trimmings for doors are an abomination to both builders and users, and those who have been annoyed with loose knobs and springless bolts always feel a certain amount of pleasure when they grasp the solid furnishings of the higher-priced hardware. The knob, however, and its spindle, are not the only parts in cheap locks that are faulty; the rose, which should act as a steady for the knob, is, in the usual run of door furniture, merely a loose appendage to it, of no use but to hide the hole in the door, the tacks by which it was put on having come out by being constantly acted upon by the shoulder of the knob upon their heads, the rose having ceased to carry the knob, and become a mere hanger on; the square edges of the spindle come in contact with the wood, and you soon have a hole something like three-quarters of an inch in diameter at the face of the door, tapering down to the lock, and however good in quality the latter may be, the play of the spindle soon drags the follower askew and wears it down on one side, the latch-bolt ceases to act properly, and the lock is condemned for the fault of the furniture. There is yet another fault in the rose: the recessed centre, which should be flat, is generally, in stamped ones, so rounded off where it takes the bearing of the sharp edge of the knob as to be soon cut through by it, and the rose is then in two parts and utterly useless. The remedy is to make the recess perfectly flat, so that knob and rose may work face to face; and the way to keep the rose in its place, so that it may carry the knob square with the lock, is to make it larger and stronger, with holes in its outer edge for large screws. If our lockmakers are to keep their ground against foreign competitors, they must pay more attention to details, and not place themselves in the hands of the furniture-makers, as the failure of the knob and spindle is that which forces itself upon the notice of the user, who will probably condemn the whole for the fault of that part most constantly in use."

TREES AND DRAINAGE.

WE have heard a good deal lately from time to time about the good effect of planting the *Eucalyptus globulus*, but it would seem that some of our native or already acclimatised trees may be used with advantage where the object is to get rid of too abundant moisture in the soil. In a recent number of the *Journal of Forestry*, Messrs. Maule, of Bristol, relate how a bog in South Wales, which was not only useless but dangerous, was reclaimed by planting it with black Italian poplar. The trees grew so well that at the end of fifteen years, when they were cut down, the produce realised £13 per annum per acre for the whole period of fifteen years, during which the crop had occupied the ground, it luckily happening that the poles were wanted in the neighbouring copper works. The strong roots of the trees running through the underlying clay thoroughly drained the bog, letting off the water in such a way that no other process of draining can accomplish. In these days of great demand for packing-cases, the timber of the poplar is very valuable, and the tree has the additional property of arriving

at a fit state to be cut down in a man's lifetime. When the timber was removed, a charge of gunpowder was inserted in each stool, which effectually burst them up, and rendered their removal easy. After the ground was cleared a beautiful, rich, firm pasture remained. With reference to the drainage effected by the poplars, it seems just possible that the good effects attributed to the eucalyptus are mainly due to its rapid growth, and the drainage of the soil by the roots, which not only absorb great quantities of water, but also supply channels for the water to filter away. If this be so in this country, where we can get willows, poplars, or alders, for planting in damp places, we need not trouble about the eucalyptus.

COMPETITIONS.

IPSWICH NEW MUSEUM AND SCHOOL OF ART.—We understand that the original decision of the museum committee of the Ipswich Town Council, selecting "Pinpatch," "Bonâ Fides," and "Simplicity" as the best of the ten designs, aroused in the town much discussion and dissatisfaction. So much was this the case, that at the meeting on Wednesday week the chairman of the committee, Dr. Holden, head-master of the grammar school, gave expression to the conviction that the committee had made a mistake in the mode in which they had voted on the former occasion, and suggested that it was desirable to reconsider the matter. The previous mode of voting was simply to vote for or against each plan, but it was now decided that first of all the committee should decide which six of the ten designs were the best, each member voting for six plans. The result was that "Architect" came out first with 11 votes; "Bonâ Fides" and "Economy" equal seconds with 10 each; "Simplicity" next with 6; and "Sûvez Moi" and "Pinpatch" each received 4 votes. Next it was decided to cut these down to half, and each committeeman voting for three plans, the three highest were "Economy," 11; "Architect," 10; and "Bonâ Fides," 9. Two of the formerly selected designs were thus bowled out—"Pinpatch" and "Simplicity"—and on the final vote, the third of the original selection—"Bonâ Fides"—also had to give way, for "Architect" received 9 votes and "Economy" 5. The design of "Architect" is therefore (subject to modifications as to which a sub-committee is appointed to confer with the author) recommended to the Council for adoption. "Architect" is Mr. Horace Cheston, of 1, Winchester-buildings, E.C., who also won the premium for the best plan for converting the Public Hall into a Corn Exchange. Alternative designs were submitted by "Architect," and that which is selected is that distinguished as "red." In our review of the designs a fortnight since (p. 613) we referred to this design as compactly arranged, the museum being placed in the centre of the group. The treatment is Queen Anne.

IPSWICH POST-OFFICE.—As we intimated a fortnight ago, the recommendation of Mr. Chas. Barry, the referee appointed in this competition was favourable to the design marked "Well Considered," and it has accordingly been adopted by the Town Council. The author is Mr. J. Johnson, of Queen Victoria-street, London.

RAMSGATE NEW ROAD COMPETITION.—A meeting of the Commissioners was held at the Town Hall on Tuesday week. It had been previously understood, that Mr. Abernethy had refused to report upon the eight selected designs, which were submitted for his reconsideration. A further report upon the three premiated designs was read, but contained nothing of interest beyond a suggested general modification of "The Desideratum," and, strangely enough, it explains how the selected designs are in non-accordance with the conditions. In connection with this meeting, it had become known that the clerk would have some notes, which he had jotted down from remarks made by Mr. Abernethy, respecting the eight designs. A warm and prolonged discussion ensued, eventually a resolution was moved by Mr. Pite and carried, "That the clerk's notes of his interview with Mr. Abernethy be received, and that the reporters be requested not to publish such notes." It has leaked out that Mr. Abernethy was very severe, in this conversation or "interviewing" by the clerk, upon the re-submitted designs, especially so with regard to the designs commended by the BUILDING NEWS. It is probable however, the

motive being obvious, that these remarks will have little weight with the Board. Mr. Pearce said, "that the Board and the rate-payers ought to know Mr. Abernethy's opinion on these several plans, and they ought to have it." A small minority of the Board then endeavoured to shelve the whole question; this was defeated, and a special meeting for the consideration of the whole question, was fixed for Friday the 27th inst. (to-day). This meeting has since been postponed to Tuesday next, when we hear a very strong attempt will be made by those on the Board representing the interests of the Harbour-street tradesmen to push forward the designs which cross Harbour-street on the Level.

THE CITY OF LONDON SCHOOL COMPETITION.—The City of London School Committee still maintain their obstinate refusal to admit the competitors or the professional Press to see the designs, even in the face of a strong out-of-door feeling among the competing architects. From what we understand, action is being taken by some of the competitors, and a protest will be made to the Court of Common Council at their next meeting. Expressions of dissatisfaction become louder every day. We have already made our readers acquainted with the favourite designs, and have mentioned the features of several others, and it may be interesting to note what the school committee appointed to consider the question and obtain designs have already done in the matter as preliminary. From the report presented on the 3rd October, 1878, the question of removal of the school is discussed in detail. Seven sites were submitted by the architect, Mr. Horace Jones—namely, portion of land on Victoria Embankment, Farringdon Market, Leadenhall Market, Fumival's Inn, Hambro' Wharf, Southwark, Finsbury Circus, and Trinity-square, and the Committee wisely selected the first-named. A sum of £50,000 was considered sufficient for the erection of the schools. The Committee having decided upon the maximum number of pupils to be accommodated—viz., 680—a conference was arranged, at which the architect and head-master attended, and visits were made to the Merchant Taylors' School and Dulwich College. The architect was instructed to prepare plans, and these were submitted under the letters B and C. A quadrangular plan, with surrounding cloisters and class-rooms, formed the basis of the design. On the ground floor the class-rooms were provided on the east and west sides, with masters' and committee-room in front and covered groined cloisters on the south-west angle, the lecture-room being approached by a long corridor on the west side, forming a separate wing in the rear. On the upper floor the hall occupied the south-west corner, and is shown on the plan 105ft. by 45ft., lighted on the south and west sides; the secretary's residence formed the south-east portion, behind which is a dining-room. A second-floor plan provided for five additional class-rooms and the culinary and residential apartments. The perspective view exhibits an over-florid Gothic treatment of Perpendicular character, the hall forms the chief feature, its gabled end facing the embankment flanked on the east by a tower entrance and the master's house. The west elevation of hall is divided by buttresses, with pinnacles, into bays, each with a window, and the class-rooms behind are treated in a quieter domestic style. A large lantern or flèche crowns the centre or hall roof. In the plan C, the cloisters, with hall over, is made the front central feature, and the arrangement is certainly more compact; with four circular angle staircases projecting into the centre quadrangle. The architect's estimate was £100,000. Mr. Horace Jones's plan has been made the key-note of several of the designs, but it is unfortunate and much to be deplored that the same committee who instructed the Corporation architect to prepare designs, and who have reported upon them, should have also invited the public competition for designs. Their opinions are naturally, more or less, already made up, and consequently unable to judge fairly of the merits of other arrangements. We may remark one of the chief objections to some otherwise admirable plans is that the lighting of the school on the east side has been disregarded by building too close to the hotel.

WOLVERHAMPTON PUBLIC PARK.—On Friday a special meeting of the Park Committee of the Corporation was held, to make the final selection of designs for laying out the central portion of

the racecourse as a public park. The number of competitors had been reduced as we mentioned last week, from 27 to 3, viz., "Al Fresco," "Fortuna Sequitur," and "Spe Labor Levis." The committee decided to recommend to the council "Spe Labor Levis" for the first premium of £50 and "Fortuna Sequitur" for the second of £25, subject to a guarantee being found that the works can be carried out for £5,000.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The closing meeting of the session was held last Wednesday; Mr. H. Syer Cuming, F.S.A. (Scot.), in the chair. It was announced amid acclamation that H.R.H. the Prince of Wales had again consented to be patron for the annual congress, which will be held at Great Yarmouth. A large number of antiquities were exhibited, among which the following call for special mention:—An alembic vessel, by the Rev. S. M. Mayhew, in the form of a dove, of Spanish workmanship, which probably contained love potions. The chairman observed that these rare vessels were made also in the signs of the Zodiac. By Mr. W. Myers, F.S.A., a classified series of terra-cotta heads from many places in Asia Minor and Italy. The nose in almost every case had been broken by the finders, and it was pointed out that this was done to prevent the finder being "haunted" by the spirit of the object represented; and by Mr. Loftus Brock, F.S.A., a series of fragments of Samian ware from Bucklersbury, among which was a name, probably that of the potter, written in cursive Latin backwards, probably one of the several inscriptions which have been read as Hebrew on similar vessels. The first paper was on the Coronation Medal of George I., Mr. G. G. Adams, F.S.A., who pointed out the poorness of the small medal by E. Hanibal, an artist of whom nothing is known. He exhibited an impression and the original die of a magnificent but unknown medal on the same subject by the well-known artist Nicholas Seelaender, and contended that this had been prepared for use rather than the other. The portrait was recognised by the Rev. S. M. Mayhew as being similar to that once at Aldgate, now in his own possession. The chairman read a paper upon St. Felix, first bishop of Dunwich, who died A.D. 650. There are sixteen saints in the Roman calendar of similar name. St. Felix is represented with the Jonquil flower. The Rev. S. M. Mayhew reported further discoveries at Lincoln. A milestone has been found standing in the centre of four great ways, as it did 1600 years ago. The inscription which has been deciphered by Mr. Wordsworth contains the name of Victorinus. The stone stands 7ft. 3in. high, and has been removed to the cathedral cloisters. A drawing of a beautiful pavement was exhibited by Mr. Parker, and it was announced that Mr. Allis had preserved several of the singular pedestals found recently. Mr. W. Morey, F.S.A., then described a remarkable Roman interment recently discovered at Hampstead Norris, and the proceedings were brought to a close by a paper by Mr. W. de Grey Birch, F.R.S.L., who called attention to the inscription on the so-called Ovin's stone in Ely Cathedral, a east of which was exhibited by the Rev. Archdeacon Emery.

CUMBERLAND AND WESTMORELAND ANTIQUARIAN AND ARCHÆOLOGICAL SOCIETY.—The first excursion of this society for the present season has been fixed for Thursday and Friday week, the 10th and 11th July, with Penrith as headquarters. On the first day Clifton Church and Hall, Nine Churches, the Countess's Pillar, and Brougham Castle will be visited. Next day the Two Lions Inn, Penrith, King Arthur's Round Table, Mayburgh, Barton Church, and the Camps in Lowther Parks and Yanwath Wood will be visited. Among the papers to be read are the following:—"A Plea for the Local Names, Part II," by Miss Powley; "Local Roman Pottery and their Marks," by R. Ferguson, M.P.; "Subterranean Carlisle," by H. U. McKie; "Recent Roman Discoveries in Cumberland—Carlisle, Botcherby, Bowness, Mowbray," by R. S. Ferguson, F.S.A.; "The Kirbythorpe Registers," by the Rev. R. Bower; "Prehistoric Find at Lorton," by J. Wilson; "The High Sheriffs of Westmoreland and Cumberland," by Sir G. Duckett, F.S.A.;

"Cumberland and Westmoreland Magistrates, Original Letters of 1688," by Sir G. Duckett, F.S.A.; "On the Practice of Mediaeval Architects and Sculptors Signing their Works," by the Rev. J. P. Hodgson; and "The Barton Registers," by the Rev. T. Hodson.

GLASGOW INSTITUTE OF ARCHITECTS.—A meeting of this institute was held on Friday last; Mr. Campbell Douglas, the president, occupied the chair, and the distribution of prizes took place. The competition was open to draughtsmen and pupils in the offices of the members of the Institute and other architects in the principal towns in Scotland. The Institute had offered a gold medal for the best design for a library and reading-room suited for a small town. The president also offered a prize for the best series of drawings illustrating the portico of St. Andrew's Church, Glasgow, with details. The drawings were publicly exhibited in the Octagon Hall, New Public Halls. For the Institute prize nine sets were submitted. The president stated that the committee appointed to award the prizes reported their opinion that the drawings given in for this prize were not of sufficient merit as to justify the medal being awarded, but, in order to mark their sense of that measure of labour and care shown, it was agreed to give a reward in books to the author of the best design. With regard to the president's prize, four sets were submitted, viz.:—A. Whitford Anderson, in the office of Messrs. James Salmon and Son, I.A.; Wm. Holmes Howie, in the office of Mr. James Boucher, I.A.; B. F. Simpson, in the office of Mr. Wm. Landless, I.A.; James Wilson, in the office of Messrs. D. M'Kissock and W. G. Rowan, architects. The prize in this competition was awarded to Mr. James Wilson. The book given was Gwilt's "Encyclopedia of Architecture." The Institute having in a former year resolved to give a gold medal annually for competition, and the President having also offered to give a prize, the following gentlemen were appointed a committee to draw up the terms of the competition for the ensuing year, viz.:—The President, Mr. James Thomson, Vice-President, and Mr. James Sellars, jun., the Treasurer. Mr. John Honeyman then adverted to a matter which had engaged the attention of the Council about a year ago, namely, the expediency of establishing a more intimate connection between the R.I.B.A. and provincial societies. The President and others having spoken generally in favour of promoting the unity of the profession, it was unanimously resolved that when the Royal Institute submit definite proposals the Glasgow Institute will give them their most favourable consideration. Before separating, the President called attention to the result of the Greenock Corporation inviting competition plans for their new municipal offices at less than the ordinary rate of architects' commission, and even less than they paid for some of their School Board work.

PARLIAMENTARY NOTES.

THE PROPOSED WIDENING OF LONDON-BRIDGE.—In the House of Lords, on Thursday week, on the motion for the third reading of the London-bridge Bill, the Earl of Carnarvon took an objection to the plans, and said that the Bill might be much better styled a Bill for the disfiguring rather than for the widening of London-bridge. He also expressed the regret he felt at the passing of a Bill some years ago authorising the construction of the railway bridge at Ludgate-hill. He suggested the postponement of the Bill. Earl Granville quite agreed with the noble earl that there were so few ornamental structures in the metropolis that every precaution ought to be taken against authorising the construction of bridges which were not of an ornamental character. He suggested that the Bill be postponed for a week. The Earl of Redesdale offered no objection, and the Bill was, therefore postponed. On the following day the Earl of Carnarvon gave notice that when the third reading of the Bill is proposed he will move its rejection. We earnestly trust Lord Carnarvon's proposal will be carried.

PREVENTION OF THAMES FLOODS.—On the motion for the second reading of the Thames River (Prevention of Floods) Bill, in the House of Lords on Monday, Lord Truro said he wished to call the attention of the Law Lords to the fact that the principle of the Bill was that

owners were to be responsible for the prevention of tidal overflow; but this was in opposition to the judgment of the Queen's Bench Division of the High Court of Justice in the case of "Hudson v. Tabor." The inhabitants of Fulham and Wandsworth complained of the application of that principle to their districts, and contended that the Metropolitan Board of Works ought to be answerable for the public streets at least. The noble lord moved an instruction to the committee on the Bill in accordance with his objections. The Bishop of London suggested that as the inhabitants of Wandsworth and Fulham had contributed their full quota to the Embankment, they ought not to be called on to afford an exceptional protection to private property. Lord Redesdale stated his opinion that as the Bill had not been introduced in the form of a public Bill, the usual notices ought to have been given; but as it had passed a Select Committee in the House of Commons, it ought to go to their Lordships' Committee unfettered. The instruction moved by Lord Truro not having been pressed, the Bill was read a second time.

TENANTS' IMPROVEMENTS IN IRISH HOUSES.—With a view to encouraging the improvement of dwelling-houses in towns and villages throughout Ireland, Major Nolan has introduced a Bill for further securing tenants' improvements in small holdings. The Irish Landlord and Tenant Act of 1870 applies only to holdings which are agricultural or pastoral. Major Nolan proposes that the first section of the Act, which renders the Ulster Tenant-Right custom legal, and the fourth section, which gives a claim to compensation in respect of improvements, shall be extended so as to apply to every holding in Ireland, of a less annual value than £50.

CHIPS.

The Penrith local board of health have approved of plans and specifications, prepared by Mr. Pollock, their surveyor, for new buildings at their water-works at Eamont bridge.

On Saturday night Mr. Alfred Andrews, builder, of Bury St. Edmund's, entertained a large party of his workmen and invited guests to the number of 150 in one of his warehouses in St. John's-street, Bury, in celebration of the marriage of his son.

Mr. Lee Turner, late surveyor of Thetford, Norfolk, has been elected borough surveyor of Cheltenham.

Another new tramway in Dublin—between Westland-row and Harcourt-street railway terminus—was opened for traffic on Monday.

The statue of King Robert the Bruce, which is to be erected on Lochmaben Hill, will be unveiled in August.

The opening lecture of the Meath Antiquarian Society was given by Sir Samuel Ferguson, R.C., LL.D., at the county courthouse, Trim, on Wednesday.

The *Revue Industrielle* says that the interior of a lead pipe can be covered with an incrustation of sulphide of lead by making a warm concentrated solution of sulphide of potash flow through it for ten or fifteen minutes. Pipes thus treated seem to be covered with a greyish varnish, which prevents the water flowing through them from acting upon the lead.

A new Wesleyan chapel at Burnham, near Bristol, built at a cost of about £1,300, was formally opened on Wednesday. Plans and specifications have been prepared by Mr. A. Lauder, of Barnstaple, and the contract entrusted to Mr. Kitch, builder, of Bridgwater. The style is Gothic, and the chapel is constructed of mountain limestone, with freestone dressings, the interior fittings being of stained pitch pine.

We understand that it has been decided to close Cooper's Hill College. It was established for the training of engineering students for the department of Public Works in India. It will, however, be some time before the institution ceases to exist, as it is not intended to interfere with the completion of the studies of those now at the college. There will, however, be no fresh admissions.

The new church of St. George, Fatfield, was consecrated by the Bishop of Durham, on Monday. The edifice has been constructed after the plans of Messrs. Austin, Johnson, and Hicks, architects, Newcastle. It is built of red brick in the Perpendicular style, and has sitting accommodation for between 300 and 400 people. Mr. G. E. Forster, of Washington, had the contract.

The Khedive of Egypt has notified to the Government of the United States his intention to present the remaining obelisk standing at Alexandria to New York.

Building Intelligence.

BATH AND WELLS DIOCESAN SOCIETIES.—The annual meeting of the board of these societies was held at Wells last week, when the following grants were made:—Erection of new church at Rowbarten, a suburb of Taunton, £300; rebuilding Upton Noble Church, £10 additional; new school-room at North Newton, near Bridgwater, £25; new class-room to school at Clenden, near Bath, £11 5s.; school apparatus, Downside, Bath, £15. The secretary was authorised to make fresh arrangements with Mr. B. Ferrey, F.S.A, the hon. diocesan architect, as to the inspection of churches in the diocese.

BATTERSEA.—The new Roman Catholic Church of Our Lady of Mount Carmel and St. Joseph was opened on Thursday week. Mr. J. Adams, of Queen's-road, Battersea, is the architect. The building accommodates between 800 and 900 persons, at a cost of £2,500. The church is in the Early English style, and consists of nave (108ft. long by 33ft. wide) and chancel. It is lofty, and has a ribbed waggon-headed roof. The whole of the benches of the church are of varnished deal, made by artisans of the congregation in their spare time as their offering to the church.

BURTON-ON-TRENT.—Mr. Roddis, sculptor, of Aston-read, Birmingham, has just completed an elaborate altar and reredos for the Roman Catholic Church of SS. Mary and Modwen, which has recently been erected at Burton-on-Trent. The centre of the reredos is formed by a richly-carved tabernacle, which rises to a height of 13ft., and is fitted with beautifully-wrought brass doors, made by Messrs. Hardman and Co. On each side of the tabernacle are niches filled with sculpture, whilst above the canopies are figures of angels. The subjects sculptured are the three patron saints of Great Britain—St. George, St. Patrick, and St. Andrew; the patron of the diocese, St. Chad; the patronesses of the church, SS. Mary and Modwen—the latter with her attributes, two swans of Trent, at her feet; and the figures of St. John and St. Francis of Sales. The lower part of the altar is divided into three compartments, the centre one being occupied by a sculptured representation of the Agnus Dei, and on either side SS. Mary and Modwen are again represented, bearing scrolls with appropriate legends. The upper part of the canopies is made extremely light, the object being to show as much as possible of the stained-glass window which will be at the back of the reredos.

EARLESTOWN.—The memorial stones of a new Wesleyan Chapel, at Earlestown, were laid on Thursday week. The length of the new building, which will be in the Italian style of architecture, will be 69ft. 4in., the width 47ft. 2in., and the height from the floor to the ceiling, 33ft. 6in. On the basement floor there will be a lecture-room, several class-rooms, a minister's vestry, a heating chamber, and a kitchen, and the height from the floor to the ceiling will be 46ft. 6in. The chapel will be constructed of Bolton red brick, with Yorkshire polished stone dressings. The lecture-room will be 43ft. 2in. in length and 39ft. wide. The cost is estimated at £5,000. The building will accommodate between 700 and 800 people. The architect is Mr. George Woodhouse, of Bolton; the builders, Messrs. Harris and Sons, of St. Helen's; and the clerk of the works, Mr. Thomas Kelly, of Bolton.

LICHFIELD CHURCH EXTENSION SOCIETY.—At a meeting of the society on the 9th inst. acknowledgments of grants paid were read from Harts-hill, Talk-o'-th'-Hill, South Normanton, Ogley Hay, Oakamoor, Caldmore, Swadlincote, Charlesworth, Penley, Wolverhampton St. Peter, West Bromwich Christchurch, and Upper Langwith. The following certificates of the completion of works were read and grants ordered to be paid:—Upper Langwith, £35; Talk-o'-th'-Hill, £205; South Normanton, £63; Caldmore, £50; and Wednesbury St. Paul, £50. The following fresh applications for aid were granted:—Hog-naston, £34; Gresley (Liuton), new church, £207; Middleton, £12; Tamworth (Glascote), £133; Stoke-on-Trent, temporary church, £75; Wolverhampton, St. Mary, do., £85; Dawley, do., £11; Mow Cop, do., iron, £45; Salop, All Saints, £156 additional; Edstaston (Glossop), parsonage, £200.

LITTLE LEIGH.—The new church of St. Michael and All Angels, Little Leigh, was consecrated on Thursday week. The church is in the Early English style, and consists of a nave 50ft. long by 20ft. 9in. wide, a choir, chancel, and north transept. The exterior of the walls are faced with Northwich facing bricks, with ornamental cornices, strings, &c., and terra cotta dressings. The inside of the walls is faced with red Northwich facing bricks. The chancel is lighted by a circular window, executed in terra cotta, beneath which, and over the altar, is a reredos, composed entirely of brick and terra cotta, the principal feature of which is a representation of Leonardo da Vinci's celebrated picture of the "Lord's Supper." This has been executed in terra cotta in alto relieve by Mr. Jabez Thomas, of Northwich. The pulpit and reading-desk are of oak, and the font consists of a red stone bowl, resting on an ornamental brick pier. Over the choir rises a bell turret of timber, covered with oak shingles. The whole of the works have been carried out by the contractor, Mr. Richard Beckett, of Hartford, from designs, and under the personal superintendence of the architect, Mr. Edmund Kirby, of Liverpool. The church will seat nearly 200 persons, and the total cost has been £2,500.

RUGELEY.—New public buildings, at a cost of about £7,000, have just been completed at Rugeley, for the local board, by Messrs. Dawson and Bradney, Wolverhampton, from the designs of Mr. Tadman Foulkes (of the firm of Messrs. Foulkes and Ryland), Town Hall Chambers, Birmingham. The style is an adaptation of the Middle Pointed or Early Decorated Gothic, the materials used being red bricks with Bath stone dressings. The construction will find accommodation for the business of the local board, the police-court, the county-court, and the market, the hall devoted to the latter being 66½ft. long (exclusive of entrance), 4ft. wide, and 40ft. high. It also comprises a caretaker's residence, a reading-room for the institution, formerly carried on in the old buildings, a fire-engine station, and an armoury for the local volunteers in the tower, which rises to a height of 90ft. above the entrance to the market hall.

SOUTHAMPTON.—A portion of the new church of St. Mary, Southampton, which is intended to form a memorial of the late Bishop Wilberforce and to replace the old parish church, was, on Thursday week, consecrated. The foundation-stone was laid on the 12th of August last, so that within a year the chancel, the chancel aisles, and vestries, and one section of the new nave have been erected and completed for use. The remaining four bays of the old church, which was erected in 1711 with materials taken from the ruins of Netley Abbey, will be taken down and replaced as soon as there are funds sufficient in hand to proceed with the work. For the part already finished the expenses incurred amount to nearly £10,000. It is estimated that a further sum of £4,000 will cover the cost of finishing the church without the spire, and that £4,000 more will be required to complete the building according to the designs of the architect—Mr. G. E. Street. The building is in the Early English style. Swange ragstone has been used for the outer walls, with Bath stone dressings, and the latter kind of stone has been employed in the interior generally, though the open tracery of the choir screens and other finer work is Cersham Down stone. The arches are decorated with dog-tooth enrichments, and a panelled and moulded stone screen encloses the chancel. The arched roof of the chancel is of panelled and moulded oak, while the roof of the nave, with moulded ribs, is of deal, as this will be decorated. The reredos from the chancel of the old church is placed in the north chancel aisle, which can be used as a chapel for morning services.

STOWE.—The church of St. John the Baptist, Stowe, was reopened, after restoration, last week. The restoration has thrown the tower into the nave, removing western gallery, and forming an arcade with new aisle on the south side. The arcade consists of three bold arches and adds greatly to the proportion and symmetry of the church. The plaster ceiling has been removed, and the present timbers, though of a rough character, have been exposed to view, and carved bosses, corbels, and pendants added, whilst the whole under side has been boarded upon the rafters. A vestry or sacristy, with heating chamber underneath, has been added on

the north-east side. The church has been re-seated throughout. The walls are unplastered, the old stones being exposed to view and pointed in black mortar. In pulling down the north wall a curious round-headed arch was discovered, which had probably been connected with a mural monument or tomb. It has been carefully preserved and rebuilt in the north wall. The stonework has been dressed and pointed inside, but outside the old stones have been used without dressing-off or disturbing the old grey coating, and the work of the new aisle is thus in harmony with the old fabric. A base and shaft of an old churchyard cross, discovered on the south side of the churchyard, have been restored and reset. The architects under whose direction the work has been designed and carried out, as also that previously done in the chancel, are Messrs. W. G. Habershon and Fawcner, 38, Bloomsbury-square, London, and Newport, Monmouthshire, the builder being Mr. Whittingham, Newport, Salop.

THURLES.—The new Roman Catholic Cathedral of the Assumption at Thurles was consecrated on Sunday. The original structure, which consists of nave, apsidal chancel, transepts, and aisles, measures 212ft. long by 120ft. across the transepts, and 75ft. across the aisles, and was erected from the designs of Mr. J. G. McCarthy, of Dublin. Many improvements and additions have been carried out under the superintendence and from the plans of Mr. G. C. Ashlin, of Dublin. These include inclosing the cathedral area by wrought-iron and gilt-headed railings, the laying of a flagged terrace round the building, approached by a western flight of steps, and the sculpturing of tympana in relief, and filling the niches with statues. Within the building a scheme of decoration has been carried out; the arcade capitals have been carved, and medallion heads of saints placed in the spandrels. The chancel has been separated from the nave by an arch supported on marble shafts with Portland stone, and also by a communion railing executed in white and coloured marbles, enriched with carving and opening with gilt metal gates. The floor of the ambulatory round the chancel has been paved with encaustic tiles, and the chancel itself has been richly furnished with archiepiscopal throne, sedilia, prebendaries' stalls, and benches for the college students, all of oak, carved. The whole 103 windows in the church have been filled with painted glass. The new pulpit is hexagonal, and of various kinds of marble; five of the six panels contain white marble reliefs of our Lord and of the Evangelists. The building works have been carried out by Mr. J. Newstead, of Fermoy; the communion-railing and pulpit by Mr. P. J. Neill, of Dublin; the oak fittings in chancel, and benches in nave, by Mr. P. Beakey, of Dublin, and the carving by Messrs. Earley and Powell, also of Dublin.

TRESCO.—The new church at Tresco, Scilly, to which we briefly referred last week in our "Notes in the West," was opened on Tuesday week. The dimensions are 81ft. by 22ft. in length, width at the transept 48ft. by 24ft., and the seating accommodation is for 250 persons. The church is cruciform in shape, and is surmounted by a small square tower, which stands on the south-east side. The roof is arched, and of pitch pine, and the whole of it, as indeed the entire main fabric of the church, has been executed by workmen on the Tresco Estate. The reredos is made of Cornish marble, and is the workmanship of Mr. Bradbury, of Penzance. The pulpit is of neatly-carved woodwork with a stone pedestal.

WIGTOWN, N.B.—A new Roman Catholic Church, at Wigtown, N.B., was recently opened. The building was designed by Mr. Garden-Brown, of Gray's-inn, London. The plan consists of a nave, apse, north and south transepts, and sacristy. The style is Early English: and, according to the *Tablet*, it is the only brick church in Scotland of any denomination. It is seated to hold about 300. The altar was the workmanship of M. Poussielgue-Rusand, of Paris. The total cost of the erection will be about £1,500.

The Wesleyan chapel in George-street, Great Grimsby, is closed to allow of alterations affording more seats and better exits from galleries and for renovation and decoration. The structural portion of the work has been placed in the hands of Mr. G. Thompson; the decorations in those of Messrs. Robinson and Emerson, also of Grimsby.

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[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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BUTLER. (There are no such competitions in connection with the Architectural Association, but those in connection with the Science and Art Department. Join the nearest School of Art, and you will get all necessary information and facilities.)—**INSURER.** (The district surveyors are elected by the Metropolitan Board of Works as vacancies occur.)

"BUILDING NEWS" DESIGNING CLUB.

EDWIN HASTE. (We think your suggestion is worth adoption.)

DRAWINGS RECEIVED.—Stefano.

Correspondence.

CURIOSITIES IN ARCHITECTURE.

To the Editor of the BUILDING NEWS.

SIR,—In your article headed "Notes in the West," reference is made to the fact that a Mr. Abbott, formerly partner in the firm of Flockton and Abbott, architects, of Sheffield, has offered gratuitous designs and a bonus of fifty pounds for the proposed new church at Newport, near Barnstaple, and further that this proposition was made after another firm of architects had by desire prepared designs for the building in question.

It may be remembered that it was Messrs. Flockton and Abbott who were the architects of that terrible iron-clad looking affair, the Albert Hall, at Sheffield, and it may not have escaped the recollection of some of your readers that when in 1875 the Prince of Wales' visit to Sheffield was anticipated, it was seriously discussed whether the Hall should not be altogether covered up with flags.

It is to be hoped that the Newport design may be different to former works, or it might—forgive the suggestion—even be dear at fifty pounds.

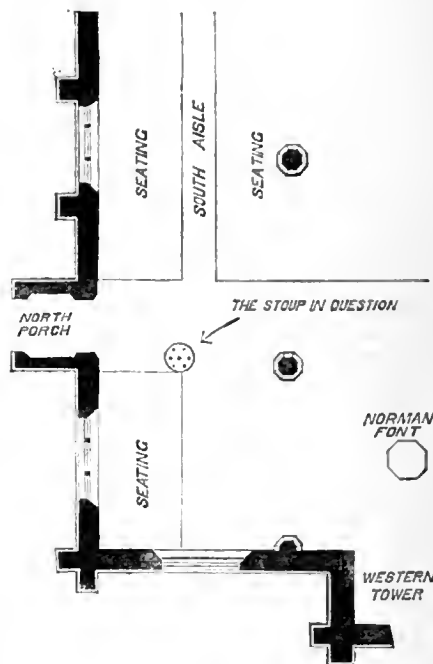
What would architecture come to if its votaries were all to follow in the steps of that lover of Queen Anne, who is a tile maker, and a manure-merechant as well? I had not long ago an illustrated circular sent me, wherein Lauder and Smith, of Barnstaple, introduced to my notice some remarkable designs in the way of crestsings and pots; but I had no idea at the time, although I found it out afterwards, that the first-mentioned member of the firm was an "architect."

Permit me, in view of possible business transactions, to ask whether "architects, tile makers,

and manufacturers," undertake, of course for a consideration, to cart away their own rubbish as well?—I am, &c.,
YORKSHIRE.

A SINGULAR STOUP.

SIR,—Mr. J. T. Micklethwaite thinks the curious Cornish stone at Lewanick, to which attention has been drawn, is a cresset-stone. A cresset, I take it, is an open frame, for fire or lantern, placed upon the top of a beacon; but what a cresset stone may be, I do not feel at all sure, and, no doubt, with many other readers, shall be glad of further explanation. I possess no plan of the church to refer to, but I was in it just a fortnight ago, and my memory is sufficiently trustworthy, I think, to say the following represents precisely where the stoup, or cresset, or whatever it may be, stands.



A nick, at some remote period of time, has been cut in the upper part of the side of the bowl to make it fit tightly against the projecting bead of the book-board standard. It is quite possible that the base had no original affinity with the upper part. The two are not dowelled, nor cemented together in any way; the top stone merely stands *in situ* by force of its own weight. (The circular portion) is just as heavy as I, who am an averagely strong man, can fairly lift.—I am, &c.,
HARRY HEMS.

THE WESLEYAN THEOLOGICAL COLLEGE COMPETITION.

SIR,—"Candeur" in your issue of the 20th inst., raises the old question regarding the cost of competition designs, but in this case it is hardly worth while, as it must be evident to any one who has gone closely into the subject, that £23,000 will never build what is wanted, unless the college is to be simply as plain as a cotton factory. The Committee ask—as Committees often do—what their better judgment must tell them they cannot get, so the question of cost may as well be dismissed at once, just as Mr. Barry has been obliged to do in the case of the Ipswich Post-office. A much more serious question however yet remains: I heard it stated by a competitor, when the designs were on view, that in the course of his inquiries he had "found out," the Committee would not have any plan designed on the old college arrangement of a quadrangle, that in consequence of this information he threw over a design he had commenced on this principle, and began *de novo* on another scheme; that in fact, the Committee did not want a "college" at all, in the usual sense of the word, and meant rather to discourage the idea. Now, is this so, or is it not? If it is, then the Committee are culpable in not having said so plainly in their instructions to architects; some confirmation is certainly given to the statement by the fact that not one of the prize designs is on the quadrangular principle, to the manifest

detriment of some very much better ones, which are. Should the Committee therefore, or their referee, condescend to reply to "Candeur's" remarks about the cost, it is only honestly due to those gentlemen who, relying on the fairness of the Committee, did not think it necessary to "find out" anything to the contrary.

The mention of the referee brings up the whole subject of the management of competitions. The appointment of a referee of high standing has been generally quoted as the panacea for all the evils of the system; but the result in this, as in some other cases lately, has been lamentably disappointing; apart from the question of "Principal" of plan on which the award has been made, and as to which the referee may have been acting under orders, it is clear, after an examination of the designs, that the selection was made, mainly, if not solely, on the merits of the plan alone. Now, Sir, architecture is generally allowed to be a fine art; if it is not, then let competitions be confined to arrangements of plan only, but if it is, then the artistic side of the question certainly demands more consideration than it can be said to have received in this instance. No one contends for the adoption of a bad plan for the sake of good architecture, but utility may be pushed so far as to extinguish art altogether. The arrangements of a plan can be modified by consultation much easier than the features of a design or the character of its detail can be changed from the commonplace to the artistic. In fact you may, by alteration, get a good plan; but you will never, by any process in the world, get artistic work out of a man who hasn't got it in him. In the case of this college—granting, for argument's sake, the excellence of the first prize plan, which, by the way, has nothing either of the sentiment or the traditions of a college about it—what of its architecture? With all due deference to Mr. Waterhouse's taste, it is very commonplace work. We may be told—Nothing more could be afforded. An artist can always make his work artistic, however simple. It is not said in any way that Mr. Waterhouse did not act in perfect good faith; he is much too honourable for that. He doubtless made the awards to the best of his knowledge as a practical architect, but it does not by any means follow that his judgment is infallible, or that a better selection could not have been made, alike in the interests of art and the college itself. But in planning, the selected design is really no more a college than it is art in architecture. The whole sentiment of the plan is foreign to the traditions and associations of an English Alma Mater. The class-rooms are very well arranged together, but nothing else is; and the domestic offices are in many respects very bad indeed. It may be an "institution," an "educational establishment"; it may even be the favourite arrangement of the committee, or anything else you like: it is not a college in the true sense of the word. What, then, becomes of the trust in the judgment of a referee? Simply an award according to his taste and knowledge, which may be good or bad, affecting the weal or woe of the progress of architecture just in proportion as he himself is an artist or the votary of a particular school. It is high time, Sir, that some one spoke out in the interests of architecture as a fine art, which the system of competitions, as at present conducted, is doing more than anything else to stamp out of the country.—I am, &c.,

FLORENT ARTEX.

CLEEVE ABBEY.

Sir,—In connection with a paragraph, p. 709, in your last issue, it is due to myself, and necessary to preclude any similar misapprehension in the future, to state explicitly that to my knowledge and regret Mr. Edmund Sharpe never visited Cleeve Abbey. The exhumation of the church was conducted during two months by myself, with the indispensable and cordial countenance of the owner, Mr. Luttrell, of Dunster Castle, my only assistant being Mr. Sampson, of Dunster. I gladly welcomed Mr. Ferrey, F.S.A., and Mr. J. H. Parker, who came to see the operations in progress.—I am, &c.,

MACKENZIE E. C. WILCOTT.

YORKSHIRE FINE ART AND INDUSTRIAL EXHIBITION.

Sir,—In your notice of the stained glass, the window with the subject from the "Bourgeois Gentilhomme," on the south-west stairs at the York-

shire Fine Art and Industrial Exhibition, is described as being by Messrs. Campbell and Smith. As this window is exhibited by me, and Messrs. Campbell and Smith have no connection with it whatever, I should be greatly obliged if you would correct this in your next impression.—I am, &c.,

WALTER HENSMAN.

Intercommunication.

QUESTIONS.

[5809.]-**Extras.**—Will some of your readers kindly inform me if the ordinary charge of 2½ per cent. for quantities can be charged for extras on the same building?—J. R. B.

[5810.]-**Wood Working Machinery.**—Will any reader of this journal, well acquainted with wood working machinery, kindly give his opinion on a moulding machine head, which will carry any number of moulding tools within its length without said tools being slotted? I have lately made a machine for making small mouldings, and have made the head after the above short description. I have never seen anything like the above, neither has any one to whom I have shown it. The head referred to is 6½ in. long, and will carry 10 tools ½ in. wide on each alternate square, making 20 tools in all, and two cuts in one revolution. Of course, one row of tools only can be used if required, making one cut in one revolution. I invite a candid expression of opinion on the above.—B. H.

[5811.]-**Store Floors.**—I would feel obliged by some experienced reader kindly answering the following:—What would be the best scantlings for a floor constructed of pitch pine of 23ft. 9 in. span, to carry corn? I propose running a longitudinal beam down the middle, supported by iron columns 9ft. to centres. Placed on this from wall to wall would be cross binders 6ft. centre to centres. The flooring to be of 3 in. planks, tongued with hoop iron. Would it be economical to use iron fitches in the binders? I would also like the scantlings for a similar floor of 25ft. 6 in. span. I have worked out the formule myself, but I am afraid there is some discrepancy. The factor is safety for a live load is put down as from 8 to 10 of breaking weight. Is this breaking weight in middle or distributed? Would 2½ cwt. to foot superficial be enough for weight of goods and floor itself?—SAFETY.

[5812.]-**Abroad.**—I am a clerk of works of considerable experience, a fair draughtsman, a good correspondent and book-keeper, and thoroughly conversant with office routine. Being desirous of emigrating, I would feel grateful if any of your readers who have had experience abroad would kindly favour me with their opinion as to which would be the best country to go to—Australia, New Zealand, South Africa, or America.—R. G.

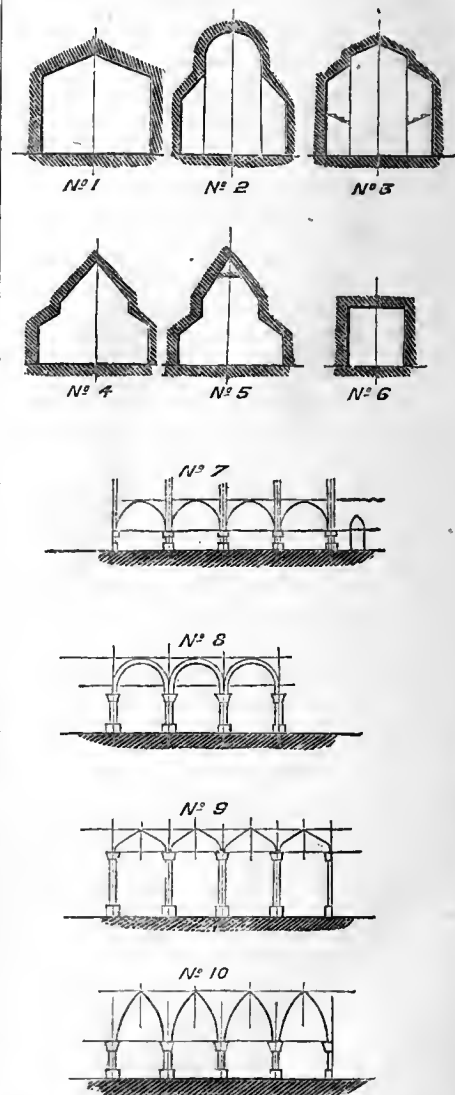
REPLIES.

[5773.]-**Lime.**—As H. Ambrose seems to think I did not quote from good authority, allow me to ask how it is that the terms "poor lime" and "rich lime" are in use in the Building Construction Classes, under the Science and Art Department, South Kensington? Surely if they were not proper they would be discontinued. I have also to thank "H. A." for the latter part of his letter.—J. S. GOLDTHORP.

[5787.]-**Strain on Collar Beam Roofs.**—In reply to "S." if I were to make a couple of model roof slopes—say, 2ft. by 3ft. each and 1 in. thick, and covered with two or three thicknesses of lead to make them heavy, and hinged together at the ridge, and to have very small wheels at the lower edges or feet, and if he were to have two model walls—say, 4 in. thick and 30 in. apart, and then a number of eyes screwed into feet of roof slopes, and confine them at 32 in. apart, and were to place them on the walls, having confined them by a great number of lengths of sewing cotton strained across separately, he could remove his first tie, which had temporarily held them, and knowing the number of his threads, he could, by cutting them one at a time, and counting them, discover how many held the slopes, such being the number they broke with plus one. Now, if he were to have a groove in each underside of slopes, and a collar board fitted loosely in it would be capable of acting as the strut he speaks of; but he would at once discover that before it could be made to do duty as a strut he would first have to tie in his roof slopes, and if his collar were half way up the slope, that he would require twice the number of threads that he did at the wall level. Supposing the threads to be half way up, and this he could easily prove by having some hooks screwed in under the collar but well clear of it, and until he put the right number according to height of hooks the threads would snap, and his collar drop down the instant he removed his temporary stoppers against the feet of his roof slopes. But "S." seems to think that the walls should resist the rafters, and if so I can only remark that the rafters would be likely to thrust out his walls. It would not pay very well to build them thick for that purpose, but if so then the wall plate would be pushed off the wall. Our experiment supposes that we employ thread for ties and collars for struts, but in practice the collar, if used as a strut, could also be used as the necessary tie by the addition of bolts, and until it became strong enough to overcome the tensile strain we have seen that it could never act as a strut, and it must, I should think, be manifest to any one that when it is strong enough to overcome the tension it is still in a state of tension, because let the tension be = x, then if the strength of collar in tension be = to x y it would be absurd to say that y was in compression, because if so where would the compression come from? For how can a roof slope have a tendency to go two ways at one time? Roof slopes have a tendency to part at their feet when tied at the top or ridge, but if they were tied at their feet then "S.'s" idea with respect to the collar acting as a strut would be correct; but I beg to remind him that he supposes an absurdity—namely, the use of a collar with a tie beam underneath it, and which would really be represented by a queen-post truss, where the straining beam would be the collar he speaks of; but then why misname it a collar?—and besides, they do not put straining beams one third of the height of the

rafter from the plate to the ridge, as then the rafter only reaches up to the head of the queen-post, and further it would be no great discovery that the straining beam was in compression. Again, the word "S." uses, "concentrate," is quite inapplicable to the composition and resolution of forces in a roof with straight walls. I have not concentrated but resolved the forces at the plates and apex, and which vary according to the direction in which they are opposed, and the forces I have obtained are those consequent on the weight equally distributed on or along the rafter. "S." could also prove this by placing an equally distributed load on a large table top, and then by placing his finger under one of the four legs he would obtain a practical proof of the presence of half of the load resolved at one point, and again it is inadmissible to use the term approximation to that which we can exactly determine, that is if the word exact is to be allowed in practice as for example that $4 = 2 \times 2$. And, again, the term "equilibrium" is equally out of place, because, derived from *libra*, a balance, and if there is anything balanced in a collar beam roof, where is the fulcrum? Again, the term "centre of gravity." Although we have a centre of gravity in our roof, yet we use it not, as what we have to deal with are the extremities of gravity: the exact sciences must be dealt with with comprehension or not at all. The word "seem" is also inapplicable.—HENRY AMBROSE.

[5803.]-**Proportion in Church Architecture.**—In reply to "Perplexed Student," a well-proportioned church is one which is at least fairly satisfactory for the purpose for which it was built, and which also enraptures the vision whether seen from within or without. To design such a church it is necessary to have acquired a considerable amount of intuitive perception as to what looks best under given conditions, and as by the well-known law of permutations whereby thousands of changes may be rung upon a few bells, so may also thousands of arrangements as to design be made on that which, although



perhaps slightly altered, may nevertheless be considered as to all intents and purposes practically the same plan, and the resulting multiplicity of possible arrangements in design, some good, the majority indifferent, and no inconsiderable number being execrably bad, renders the endeavour to write rules easy to recollect and adopt at the right time and place no easy task, if indeed possible at all. It may be possible that the best method to adopt would be to know a few golden rules in planning and design, and endeavour to adopt as many as possible, and being at the same time alive to most of the mistakes previously committed by others and keeping a good look out to avoid if possible the same. In designing, it is just as well to be aware of one fact above all others, and that is that as a rule a good and masterly original design must be patiently and persistently improved, and by degrees brought as

near to perfection as possible; but to do this it will sometimes be necessary to pull the whole design to pieces several times and eliminate all that is unsuitable for that design. Let each part be in keeping with all the rest, but to achieve this it will, as an almost invariable rule, be a necessary condition that the eye and understanding shall have been under training by some means or other for several years, or the designer will generally quite unconsciously perpetrate many absurd mistakes, and which, should he continue his studies, he will, from time to time, become aware of with astonishment. Perhaps one of the very first things to achieve is good acoustical construction, and it is perhaps less generally known than it should be that the solution consists in the hearer catching the direct reflected ray of sound from the speaker, and this he can only do if there be a roof surface at a proper angle for such purpose, and this can be judged of by the following method:—Raise the height of the hearer to that of the speaker, and imagine a cord stretched from one to the other, and bisect it and strain another from the bisect in the former, and continue same to the roof, and if at any part of the roof surface it is perpendicular to the plan of same, then the acoustical points are satisfactory where tested, and if any other points will bear the same test then the building is acoustical, and, if not, then alter the pitch of roof so as to make them so. Figures 1, 2, 3, 4, 5, and 6 are good sections for the conveyance of sound. As sound reflectors perpendicular walls are next to useless, because the lower portions of them are so perforated, recessed, and obstructed by piers, &c., as to prevent radiation, and sound reflected at an inclined angle cannot be directed to the hearers, and therefore the less vertical wall there is the better, and cloistories can hardly improve acoustical properties, although they are doubtless sometimes very desirable for light. Then having determined on a section as suitable, next determine the distance the columns shall be apart in the nave arcades. I think I should generally prefer to make them from centre to centre, equal both across the nave and longitudinally. I should endeavour to avoid equality of height between—from floor to top of capital and from top of capital to vertex of arch, as not being a pleasing proportion to view. I should likewise particularly avoid putting an equal number of lights or windows in an east or west wall, as I believe such is most destructive to good effect. I would put one light, 3 lights, 5, or 7 lights, and if Early English then I would group them with a bold and effective arch of suitable curve and height, and to be generally well managed. But to revert to the arcade. Having determined the width of a bay, then determine the number of bays you will have, and I think with a good section you may easily put five bays, and then you will have obtained the plan of nave floor and width of aisles, and from which you can plan and add all else you desire. I have given examples, No. 7, 8, 9, and 10, of various kinds of arcades I might adopt in preference to some others. I should avoid where possible the obtaining wall spaces of unseemly shape above the chancel arch and under roof, and likewise at the west wall, as, however well such may be filled up, the leading lines will continue to dominate and compel thee to discern that something has not yet been altogether successfully arranged. With respect to chancels, apses, towers, and spires, &c., they would run beyond the limits of this paper. —HENRY AMBROSE.

[5805].—**Eddystone Lighthouse.**—So far as I am aware there is no record of the cost of the three lighthouses built on the Eddystone rock. Winstanley commenced his in 1696, and it was finished three years afterwards. It was of wood, 100ft. high, and had an open gallery at the top. During a fearful storm in 1703, and whilst Winstanley was in it, the building was completely washed away. Mr. Henry Winstanley was an Essex country gentleman, an amateur, but a man of singular mechanical ingenuity. Three years afterwards, in 1706, John Rudyerd, a silk mercer, of Ludgate-hill, E.C., commenced his work upon the same spot. Choosing the frustum of a cone for his model, he built up five courses of heavy stone upon the rock, and thereon erected a superstructure of wood. This stood well and worked admirably until the end of 1755, when it was unfortunately destroyed by fire. It was afterwards that Smeaton designed the present beautiful lighthouse, the foundation-stone of which was laid in June, 1757, and the structure completed in August, 1759. It is particularly interesting in that in its day it was foremost of almost all other lighthouses. The only other stone-built rock beacon in the world was the Tour de Cordeuan, in the Bay of Biscay, a tower 97ft. high, erected on a spacious flat rock at the mouth of the Garonne, in the 16th century. Half a century after the Eddystone the Bell Rock Tower, on the Inch Cape Reef, was built, with an altitude of 100ft. Forty years ago Mr. Alan Stevenson built the Skerryvore lighthouse on the West Coast of Scotland, which is 138ft., and its bulk five times that of the Eddystone. The present Eddystone is 80ft high, and upon the upper course of granite beneath the ceiling encircling the upper room runs the homely:—

"Except the Lord build the house
They labour in vain that build it."

The engineer for the new lighthouse is Mr. James W. Douglas, consulting engineer of the Trinity Board, a gentleman of great ability, and the constructor, I believe, of the lighthouse at Hartland, St. Catherine, Isle of Wight; St. Judwall, North Wales, and the Casquets, off Guernsey. The new lighthouse at the Eddystone will stand 132ft. above the level of the highest spring tide. At one time it was mooted to remove the rock altogether, but that would have involved the shifting of 2,000,000 tons of stone, at a probable cost of £500,000, so that idea was given up. The new job was open for competition some little time ago, and Mr. John Petrick's tender for the lighthouse was £100,000. The Elder Brethren of Trinity House, however, considered they could carry out the work for some £30,000 less than that, and so, under the superintendence of Mr. Thomas Edmond, the resident engineer, the works have begun, and it is expected they will be completed in about three years. The workmen are paid 30 shillings a week, and an additional 6d. per hour afloat, and 6d. extra again an hour when at work fixing, &c., upon the rock. Forty men are employed upon the job, which lies 127ft. away from Smeaton's present tower. The granite blocks that will be used will average 3 tons each. They are first brought from Messrs. Sheares, Smith, and Co.'s quarries, at Wadebridge, ready dressed, to the Trinity Yard, at Oreston, near Plymouth, are fitted in their courses there, and will then be conveyed

in the floating Hercules to the reef, 14 miles distant. The Hercules was built purposely for this class of work by the Trinity Board. Her engines are adopted for lifting and pumping, as well as for locomotion; smiths' shops are on board, powerful winches, and her bows are fitted with "gallows," by which practically any weight can be put ashore from the deck. Mr. W. T. Douglas, son of the architect himself, is appointed assistant engineer on the works. —HARRY HEMS.

[5806].—**Builder's Day Account.**—The building committee have a right to dispute your charges, and to employ a surveyor to measure and value your work. You are not obliged to accept the surveyor's valuation. Sue the committee. I make no doubt they will pay into court the sum of the valuation made by the surveyor, and that the judge will order an arbitration on the balance. Judges as a rule will not give their judgment on builders' accounts, which are complicated and can only be judged by a competent and disinterested surveyor, chosen mutually by both parties. —WILLIAM JACKSON.

STAINED GLASS.

CHICHESTER.—A somewhat remarkable example of French glass is in process of insertion in the famous south transept window at Chichester Cathedral, well known as one of the finest examples of the Early Decorated style. The stained glass which originally filled it was destroyed by Waller's pikemen at the Great Rebellion; and years ago, whilst the new tower and spire were building, Mr. Abel Smith, then M.P. for Chichester, promised to repair the damage thus done to the effect of the church. He died, however, before carrying out his purpose, but his family liberally volunteered to do what their father had intended, and selected a French artist (M. Champigullo, of Bar-le-Duc) to execute the work. The Franco-German war for a long time suspended all operations; and it is only now, says the *Guardian*, when nearly every member of the Chapter which originally accepted the gift has passed away, that the window has been completed.

LEGAL INTELLIGENCE.

ADVERTISEMENT HOARDINGS.—At Marylebone, Messrs. Langmead and Way, builders, of Gray's-inn-road, were summoned on Tuesday, by Mr. Henry Tomkins, surveyor for the parish of St. Marylebone, for continuing a certain hoarding or fence at Nos. 119 and 120, Oxford-street, for the purpose of depositing bricks or other materials, in a manner not permitted by a certain licence granted by the Vestry of Marylebone to them on the 10th of May, 1879, for a period of 10 days beyond the 5th day of June, on which day a penalty of £1 was inflicted on them for erecting such hoarding, contrary to the aforesaid licence. The defendants were contractors for rebuilding Nos. 119 and 120, Oxford-street, and they, having obtained a licence from the Vestry for the erection of a hoarding outside the premises on the public way, to the height of 10ft., erected one 25ft. high, and it was let to Messrs. Willing, the advertisement contractors, and was covered with bills. For not erecting the hoarding in accordance with the licence the defendants were summoned before Mr. D'Eyncourt, who was then sitting at this court, and fined £1. Subsequently his worship was asked to grant a case, but he refused to do so. It was now stated that the owners of the premises in their contract with the defendants, reserved to themselves the right to let the outside for advertisement purposes, and they let the hoarding to Messrs. Willing for £10 a month. Six days after the defendants were fined, Messrs. Willing decided to have nothing further to do with the hoarding, and on the 18th the defendants proceeded to pull it down. The Vestry did not ask for the penalty beyond the 11th. For the defence it was urged that the defendants, though legally responsible, had no power in the matter, the owners having reserved to themselves the power to let the hoarding. Mr. Greenwell said that these high hoardings were injurious to the business of shopkeepers on either side, and the fact that builders received money from advertisement contractors was often an inducement for them to keep these unsightly structures up for an unnecessary time. Mr. De Rutzen said that the defendants must be held liable for allowing the hoarding to remain after the order, and there would be a fine of 10s. a day for five days, that being from the day of the order to the 11th.

IMPORTANT BUILDING TRADE CASE.—At the Stourbridge County Court on Monday, before Mr. Rupert Kettle, a case was tried in which the plaintiff, Mr. D. Hawkins, of Cheltenham, a quantity surveyor, sued Mr. C. E. Horton, contractor, Brierly Hill, Staffordshire, for £28 for taking out quantities for work done for Mr. F. Evers, J.P., a gentleman of that neighbourhood. The defendant did not dispute the liability, but he had declined to pay the money owing to there being a second claimant for it in the person of Mr. Smalman Smith, the architect to the work referred to. The case had been once before the Court before, a decision being given in favour of the plaintiff, but it now came on for a new trial before a jury. The plaintiff's case was that it was usual to pay 2 per

cent. commission to the quantity surveyor who took out the quantities for any contract; that he did so in this instance, and that the money in question was thereupon due to him. In cross-examination plaintiff said he was engaged as clerk of the works to the Stourbridge School Board and Stourbridge Burial Board in 1876, and that his engagement permitted him to do other work. It was while clerk of the works to the above buildings that he got out the quantities in this case. The quantity surveyor was responsible to the builder for the quantities. He could not say whether he signed the quantities upon which Mr. Horton tendered. The document being handed to him, witness said he did not sign. It was not necessary for him to do so, as he was known as the quantity surveyor, and saw defendant regarding the quantities. He took out a number of other quantities for work with which Mr. Smalman Smith was connected. He signed a number of them. Pressed as to this, he said he signed five, and that he did so when they originally issued. He was to have the whole of the commission for these quantities. It was not to be divided between Mr. Smith and himself. It was not usual for an architect to employ a quantity surveyor to take such quantities and allow him half the commission. He admitted being the writer of the letter to a builder, produced. In it he asked the builder to write him a document to be used in the case in his own favour, and a form for which he inclosed. Plaintiff was cross-examined as to his antecedents, to show he was not a man who could have afforded to wait for his money, as he had done, if the 2 per cent. was really due to him. Counsel for the defence called evidence to prove that plaintiff was employed by Mr. Smalman Smith to take out the quantities, and it was stated by Mr. Smith that he agreed to give plaintiff 1 per cent. for this work. It was also stated that when a quantity surveyor took out quantities on his own account he endorsed his name upon them as responsible for the figures. Where there was no name, however, the architect was responsible for them. In this instance, there being no name, the plaintiff was not specified as being responsible for them, and counsel argued that Mr. Smith was. Mr. F. Evers was called, and said he instructed Mr. Smith to have the quantities taken out. (Counsel called attention to a rule of the Institute of British Architects allowing architects to take out quantities where an employer permitted.) The evidence of defendant was to the effect that he was supplied with the bills of quantities by Hawkins. He should have looked to plaintiff as responsible if the quantities had not been right. If there had been an error in them he should have had to look to Mr. Evers. His first tender was not accepted, and he went through the quantities with the plaintiff and reduced it. His first application from plaintiff was by a lawyer's letter.—Mr. Smalman Smith, architect, in examination, stated positively that he employed the plaintiff Hawkins to take out the quantities, and that he agreed to give him 1 per cent. for doing so.—Mr. Randle, architect, Shrewsbury; Mr. James Binnicau, builder, Kidderminster; Mr. John Nurse, quantity surveyor to Mr. Pountney Smith, Shrewsbury, were examined in support of the contention as to the architect being regarded as responsible for the quantities when there was no surveyor's name on the bills of quantities.—His Honour, in summing up, said the question as to the alleged agreement between Mr. Smith and plaintiff, that the former should pay him half the commission, had nothing to do with defendant, and was only a collateral point. Referring to the conflict of evidence, his Honour said they should look to whether the conduct of the men who gave evidence contradictory of each other were consistent or inconsistent with what they stated; and in the progress of his comments on the evidence, his direction to the jury as to the points for their consideration, rather bore in plaintiff's favour. The jury, after a long consultation, and being thrice summoned into court, could not agree, and it was at last agreed to take the verdict of the majority. Four were for the defendant, and one for the plaintiff, and a verdict was entered for the former. A number of other cases hung upon this decision.

POOR WORKMANSHIP.—At Poulton County Court on Wednesday week an action was brought by Lingard, builder, against one Eaves, to recover £18, balance of an account in respect of a contract for building done involving £144. Plaintiff deposed that he built three houses at Sunnyside, Kirkham, for defendant, at a contract price of £144. No complaint as to joinery was made at the time of completion, and £126 had been paid on account. The defence was that the slating and other works were badly done. Mr. Robert Cross, architect, deposed that he had examined the plans and specifications, and the buildings, and had come to the conclusion that some of the work was so imperfectly done that £9 15s. ought to be deducted from the amount of the contract. Mr. Langley having given corroborative evidence, a verdict was entered for plaintiff for £9 15s. 11d.

WHAT IS A BUILDING?—A case important to

builders and others was heard on Wednesday at the Liverpool police-court, before Mr. Raffles. Messrs. S. Campbell and Co., contractors, Pudsey-street, were summoned for erecting a shed in Dexter-street, and infringing the Building Act by not building the outer walls and party wall of the said shed of brick or stone. Mr. Atkinson, deputy town clerk, prosecuted, and said that according to the law no erection which was of wood could be built in Liverpool. There was a case bearing upon the point decided in the Court of Common Pleas. According to the Metropolitan Building Act, it was stated "that every building shall be inclosed with walls constructed of brick, stone, or other hard and incombustible material, and the foundation shall rest on the solid ground, or upon concrete, or upon other solid substructure." A person erected a shop all in wood, without footings or any brickwork for a foundation. The question was whether the shop was a building within the meaning of the Building Act, and this point the Court of Common Pleas was asked to decide. Mr. Justice Williams held that the shop was a building within the meaning of the Act, and that it prohibited building the walls of wood or other combustible substance. Mr. Justice Byles also held that a church built of iron or of wood, or a stable or a coachhouse, is a building, but that a birdcage with a handle to it for lifting it off the ground, or a wig-box, is not a building. He (Mr. Atkinson) need not say that he would not prosecute in the case of a birdcage or a wig-box. The present case was a very serious one. It was in direct contravention of the Building Act, for it was a building inclosed with wood, in fact, in every sense a wooden building, which was not allowed by the law of Liverpool.—Mr. Campbell, for the defence, contended that there had been no infringement of the law. The place complained of was simply a shed made to allow four carriages to be run under it in case of rain.—Mr. Goldstraw, building surveyor, said it was a building inclosed with walls half of brick and half of wood.—Mr. Campbell said the question was one of great importance to contractors of all degrees in Liverpool and their clients, who might wish wooden erections to be placed upon their vacant land until such time as it might be built upon by some more permanent erections. The owner of the land in question employed him to build a temporary shed; it was simply a roof of corrugated iron being placed upon four posts. It was not connected with the old brick walls, and did not in any way come within the meaning of the Building Act. When he received an intimation that it was in contravention of the law he went and saw Mr. Hunter, one of the most experienced of the building surveyors, and he had given him authority that there was nothing in contravention of the Act, and he went on building. It was similar to the adjoining shed, which had been up for several months.—Mr. Goldstraw said this was not so.—Mr. Campbell again urged that this shed was not a building within the meaning of the Act. It was not a shed even in that sense; it was a roof upon ten props.—Mr. Atkinson: That we simply deny.—Mr. Goldstraw said the place was inclosed with wood.—Mr. Hunter was called.—Mr. Raffles: Did you give him authority to erect this place?—Mr. Hunter: I could not. It is not in my district.—Mr. Campbell: Do you remember my coming to your office and showing you this plan? Mr. Hunter: I remember nothing about it.—Mr. Campbell: Did I show you these plans? Mr. Hunter: Very likely you did. I can scarcely remember. I said if you kept away from the thoroughfare or any other building, it would not be wrong; but I could not give you any permission.—Mr. Atkinson said that the law required that a building should be of brick or stone. Since the Act came into operation the making of buildings of iron had become very popular; and although they were not strictly in accordance with the law, the authorities did not object to them.—Mr. Campbell said the place in question did not come within the meaning of the section under which the summons was laid, but under the fifth rate schedule. If it was wrong, what became of the many erections of a similar kind that had been allowed by the surveyors?—Mr. Raffles (to Mr. Campbell): I think the law is against you. I will adjourn the case. If it comes before me again, and if you have not satisfied the health committee, I will inflict a penalty.—Mr. Atkinson: These buildings are dangerous.—Mr. Campbell: Then they should not be permitted anywhere.—Mr. Atkinson: And they will not be if I can help it.—The case was then adjourned.

The Swansea harbour trustees have entered into a contract for the immediate construction of the long-contemplated docks at Fabion's bay. This decision has aroused action on the part of the Neath harbour commissioners, who have invited tenders for £200,000 in mortgage bonds of £100 each. Their intention is to provide floating dock accommodation at Neath by means of a navigable cut, which will divert the stream and will enable the present bed of the river to be used for that purpose.

Our Office Table.

Mr. G. E. STREET asks, in the *Times*, "Is it too late to make a last appeal on behalf of London-bridge? No one has yet been found bold enough to say that the scheme for its alteration now before Parliament is anything less than a scheme for its destruction. And the only plea I have seen in its favour is the scandalous one (as it seems to me) that it is economical. Are we come to this, that we are ready to destroy one of the few fine bridges we possess with a view to economy? At least, could we not leave it alone until the Tower-bridge question is settled? Twice lately I have crossed London-bridge in a cab at a trot, and without a crowd. And, as we all know, some who ought to be authorities hold very decidedly that the alteration of the bridge alone will do no good when there is a crowd. We do not, unfortunately, do much building work that has any monumental character. Our engineers no longer appear to concern themselves on this point. We may well be proud of Rennie as of one who set them a noble example. But if we destroy his work within about half a century of its erection, what encouragement is there to his successors to follow in his footsteps? Nearly four years ago you were so good as to allow me to protest against this scheme, and as I was the first, so, if it must be, I will be the last also to protest against a work which seems to me to be unworthy of a civilised age and city." From first to last we, too, have protested against the unequalled interference with Rennie's bridge. We have urged that the adoption of the proposal to widen it will not relieve the traffic in the slightest, and we do not believe, even now, that Parliament will allow the City of London to carry out its scheme.

The Hemel Hempstead Highway Board are about to build a new bridge over the river Gade, thirty feet long and eighteen wide, and are inviting competition plans for the same under rather remarkable conditions. The members of the board disagree as to the advisability of constructing the bridge of iron, of wood, or partly of both materials, and so they very coolly invite the competing engineers to send in three separate sets of plans and estimates, all at their own expense and within a period of twenty days! A similar invitation is issued with regard to a smaller bridge to be partially reconstructed in the same neighbourhood; in both cases the parties competing are to tender for the execution of the work, and in neither do the board guarantee the acceptance of any tender. From time to time we record some remarkable instances of ignorance of the value of the time and labour of professional men on the part of local boards and similar bodies, but we do not remember before to have come across such a unique example as that just referred to. One economical member of this most economical highway board, remarks, in the discussion which took place at the last meeting, that it would be best to make the bridge of wood as it was unwise to do too much for future generations, the present generation having expenses enough of its own. Competitors who feel inclined to contribute towards the relief of the present generation had better write to Hemel Hempstead at once for particulars.

HERE is another instance of the way in which Local Boards manage their business. Contractors are put to the trouble and expense of tendering, and are then politely informed that the plans and specifications were wrong, and they had better tender again. At a meeting of the Rural Sanitary Authority of the Loughborough Union held last week, the committee appointed to examine the specifications and quantities prepared by the engineer, and consider the several tenders received for the execution of the drainage works at Sheepshed, recommended the Board not to accept any of the tenders, but to direct the engineer to amend the plans and specifications, so that the contract would include the whole of the work required to be done. The committee were of opinion that if any of the tenders received were accepted, there would be large claims for extras. The recommendations of the committee were adopted by the Sanitary Authority; and Mr. Stephens, the engineer, who was in attendance, was instructed to prepare plans and sections of the work required on the

sewage farm, so that the same might be included in the contract; and to amend the specifications and quantities in the several particulars mentioned by the committee in their report, and to submit them for the approval of the authority. The clerk was instructed to inform the persons who had tendered that the Sanitary Authority had decided to amend the specifications and quantities, and that they would then re-advertise for tenders for the works required.

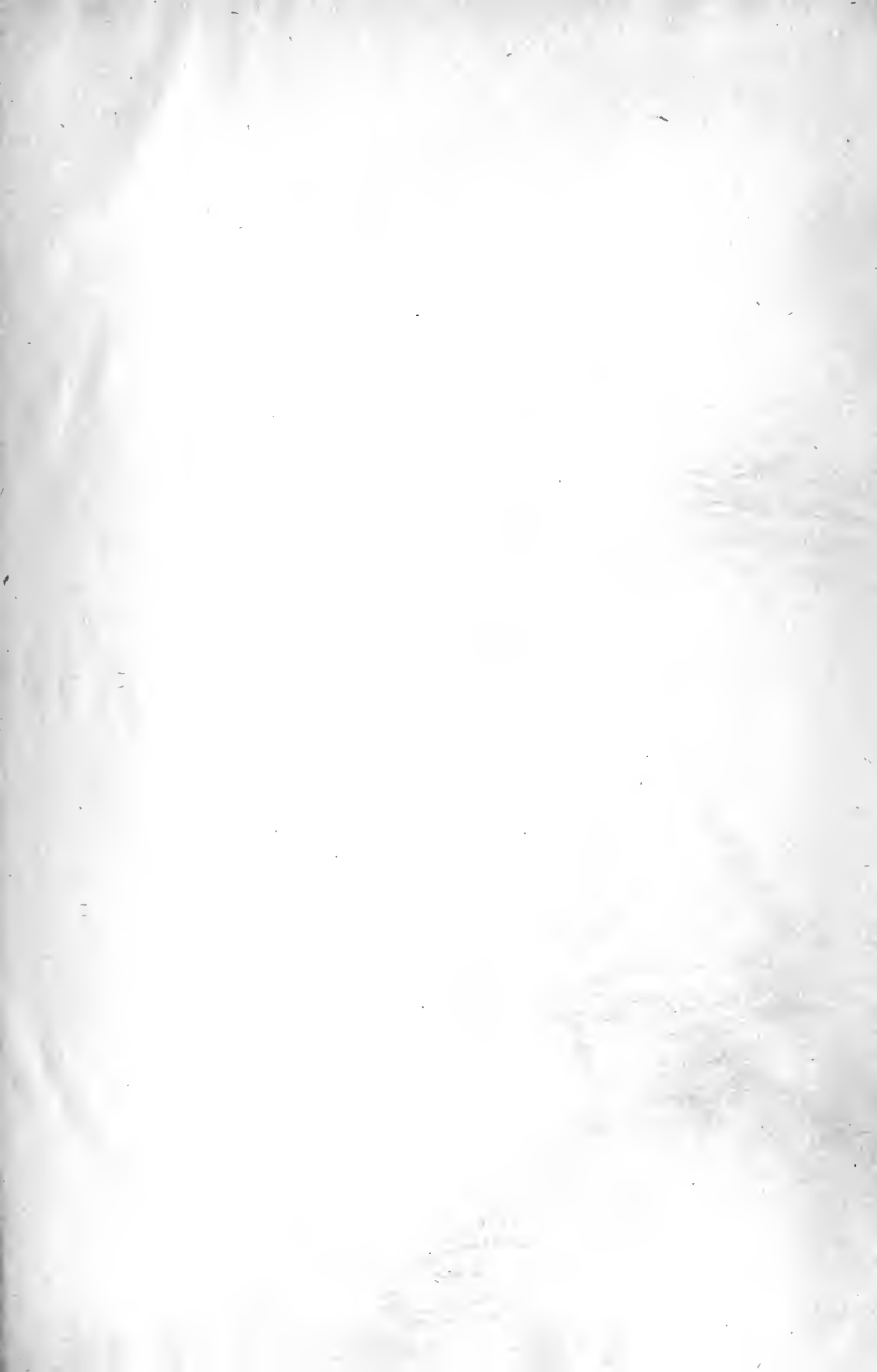
MESSRS. T. ROBINSON AND SON, of Roehdale, will exhibit at stand No. 483, in operation at the forthcoming International Show, to be held at Kilburn, on Monday next, and six following days, a new patent machine for tooling and dressing stone, which from its great utility in economising the working of stone over hand-labour, and the superior quality of work turned out, will prove of considerable novelty.

MR. RASSAM has arrived in England, having completed the programme of his explorations in Mesopotamia for the present year. Although the expedition has been hampered by the illness of Mr. Rassam, archaeologists will have no cause for dissatisfaction with the results. A considerable time has been devoted by the explorer to the solution of the relative positions of the edifices on the mound of Ballawat, from which he obtained the rich bronze gates, and there is every reason to believe that we may now have a complete plan of the site. In the mound of Kon-yunjik, the site of Nineveh, Mr. Rassam has continued his explorations in the ruins of the palaces of Sennacherib and Assurbanipal, and he brings to England a number of inscriptions in stone and terra-cotta which he has obtained from those sites. During a visit to Bagdad, Mr. Rassam succeeded in acquiring from the local dealers a fine collection of Babylonian inscriptions, many of which are of an extremely interesting character. Among these are a further instalment of the Egibi tablets, which have already proved of so much importance in the settlement of Babylonian chronology.

A LONG discussion took place at the meeting of the Liverpool Town Council, this week, upon a resolution of the Health Committee recommending that the superintendent of the sewerage department, Mr. John Evans, should be requested to resign, and that two foremen should be dismissed. Recently several sewers were examined by a special committee, when it was discovered that in six of them the workmanship was defective, the mortar and cement of poor quality, and in some cases only one course of bricks had been laid where there should have been two. Mr. Evans had charge of the sewers in question, and the allegation against him was that he had not exercised a proper oversight. The recommendation of the committee was opposed on the ground that dismissal was too severe a punishment considering the thirty-one years' service of Mr. Evans, but ultimately it was agreed to by twenty-seven votes to ten; and it was also decided that the whole subject of the staff and organisation of the engineer's department should be dealt with at a special meeting of the Health Committee.

A SUPPLEMENTAL report on the electric lighting of Holborn Viaduct has been submitted to the Commissioners of Sewers for the City of London by their engineer, Mr. Haywood. These are based on the photometric observations on the Embankment lights, made for the Metropolitan Board of Works by its engineer-in-chief and consulting chemist jointly. Upon the data those officials furnish, which assign to the electric light much less illuminating power than was claimed for it by the Société Générale d'Electricité, Mr. Haywood calculates that the electric light on the Viaduct, when naked, gave about five times that of the ordinary gaslight, and as inclosed in opal globes, about twice as much. Applying the present cost of the Embankment experiments (5.73d. per lamp per hour) to those on the Viaduct, and assuming the lamps to be kept alight 4,300 hours annually, the same as the gaslamps, the yearly cost would be, for the 16 electric lamps, £1,642 12s., and for the 86 gaslamps, £419, thus showing that the former means of illumination is nearly fourfold the cost of that ordinarily employed. If, however, the time occupied in lighting and extinguishing the gaslamps, about half an hour daily, be taken into account, the electric light would be burning about 4,117 hours per annum at a cost of £1,572 17s. 8d., or about 3½ times as much as gas.

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